COMPUTERWORLD

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NEWSPAPER

Microdata Set To Go 32-Bit At Info Show

By Jeffry Beeler
CW West Coast Bureau

IRVINE, Calif. — Microdata Corp. next week will launch its second business systems family with the introduction of a 32-bit supermini that reportedly provides two to eight times more throughput than the company's previous largest configuration.

Info 81 opens at the New York Coliseum a week from today, and Computerworld *will be there for what's in store, see Pages 13-15.*

The supermini also comes with two other previously unavailable features — an optional Application Level Language (ALL) that automatically writes its own code without the help of a trained programmer and a word processing system known as Wordmate.

Wordmate, ALL and the entry-level supermini are expected to make their formal debut together next week at the Info show in New York, *Computerworld* has learned.

Intended as an entry-level model for the so-called Sequel family, the supermini embodies a fundamentally different architecture than Microdata's eight-bit Reality product line and benefits from previously unavailable enhancements to the company's operating system.

The combination of an enhanced operating system and the firm's first

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NAS-IBM Pact On Software Reaches Farther Than Thought

By Robert Batt
CW West Coast Bureau

A deal giving users of plug-compatible mainframes access to licensed IBM software is apparently more far-reaching than originally revealed.

Computerworld has learned that a pact reached last June between National Advanced Systems (NAS) and IBM includes a cross-licensing agreement under which IBM and NAS users have equal access to the other vendor's licensed software, including any future releases. Until now, the pact was thought to cover only software revisions and updates known as System Installation Productivity Options [CW, June 15].

"The two companies — NAS and IBM — have reached an understanding in which IBM has agreed to provide essentially the same type of software and software support to NAS CPUs as they do the IBM ones," David Martin, NAS vice-president, said. "To the extent that NAS comes out with new licensed software, this will be made available on the same terms to IBM users."

An IBM spokesman in Armonk, N.Y., confirmed that an understanding had been reached with NAS and added that a letter had

(Continued on Page 7)

Cullinane 'IDMS-1982' Ties 14 Tools Together

By Rita Shoor
CW Staff

WESTWOOD, Mass. — With the emphasis on integration, Cullinane Database Systems, Inc. last week pulled 14 product announcements together into a package called IDMS-1982.

The introductions included three systems products and three application systems as well as new versions of eight existing systems. The products are compatible with the IBM 360, 370, 30 series, 4300 and compatible mainframes and run under the OS, VS1, MVS, DOS/VS, DOS/VSE and VM operating systems.

"The fact that these 14 products have been introduced simultaneously represents a major accomplishment on the part of the Cullinane software development, documentation and related support teams," President John Cullinane said.

The concurrent releases also pointed up the firm's commitment to tying application packages and software development tools to its IDMS — a corporate direction Cullinane announced about a year ago.

Highlighted in the new product announcements was an on-line version of Cullinane's Application Development System (ADS). Claiming that the product allows the development of on-line applications "with less skilled staff in one-tenth the time previously required" with procedural languages like Cobol, Cullinane stressed that it was designed to handle complex as well as simple applications (see story below).

Other new products include a conversion tool dubbed Escape, which reportedly permits easy migration to IDMS for users of other data base management systems (DBMS) "such as [IBM's] IMS/DL1" and a distributed data base systems (DDS) product.

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'ADS/On-Line' Spotlighted

WESTWOOD, Mass. — The spotlight fell on an on-line application development system (ADS) when Cullinane Database Systems, Inc. announced its IDMS-1982 last week.

Through integration with other Cullinane data base products, ADS/On-Line simplifies the structure of applications and automatically codes all standard system and data handling routines, according to the vendor. This allows application developers and end users to generate IDMS and Vsam applications in "one-tenth of the traditional time," Cullinane claimed.

Maintaining that traditional programming approaches provide little or no correspondence between the structure of the application and the actual interaction, a spokesman explained that the ADS/On-Line approach structures applications as an "interactive dialogue," which corresponds to the developer's view of the interaction and is also natural for the terminal user.

The product is geared more toward the applications programmer than the end user, according to Senior Vice-President Robert Goldman. He visualized a setup where the end user and programmer would sit down together at the terminal to define a required screen and the programmer would then generate the

(Continued on Page 4)

Problems Fixed, But . . .

IBM 3380 Deliveries to Be One Year Late

By Tom Henkel
CW Staff

WHITE PLAINS, N.Y. — The problems with IBM's 3380 disk drives were apparently worse than anyone expected. IBM said the units have been fixed, but the disk drives will be delivered better than a year later.

If that problem is not enough, IBM is in so far over its head in efforts to fill orders for smaller 3350 disk drives that it has issued a plea for volunteers to postpone 3350 deliveries until the second half of 1982.

IBM's biggest and fastest disk drive announced to date, the 2G-byte 3380, has been plagued by problems in the head disk assembly. While IBM still will not specify what went wrong with the units, industry sources

(Continued on Page 6)

IBM Realigns Operations

IBM last week announced a major reorganization of its U.S. sales and marketing divisions. Under the reorganization, the Data Processing, Office Products and General Systems divisions will be combined early next year into two new divisions, each of which will sell IBM's full product line to specific customers. Details, Page 6.

'The Programmer Shortage Is an Illusion'

By Rita Shoor
CW Staff

SAN FRANCISCO — Headhunters may have to run for cover if DP managers follow the lead of Rand Information Systems, Inc. (RIS) when hiring programmers.

"The programmer shortage is an illusion," according to Ethan Bortman, RIS director of Midwest operations for the system development house here. "Headhunters are as much responsible for the [alleged] shortage as anything else."

The recruiters create an artificial market, Bortman continued. "They don't just sit back and wait for calls [from job seekers."

Some employment agency representatives call programmers at work and dangle attractive job prospects in front of the technicians, he charged. Such headhunters "are like pornography," in Bortman's book. "They appeal to the prurient interests of programmers . . . they contribute nothing to society."

RIS still works with personnel firms, Bortman admitted. But it is also exploring other hiring alternatives.

One option is to take advantage of the depressed state of the economy in certain areas, the manager said. He recommended looking for technical help in economically deprived areas. There are "pockets of programmers" in the U.S. where technicians are ready and willing to relocate if they are offered the right job, he said.

There is no reason to limit the search to domestic shores, he continued, recounting the experience of an

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Passage Seen Likely

S. 898 Goes to Senate Floor for Vote

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Final Senate consideration of S. 898, the latest rewrite of the 1934 Communications Act, was scheduled to begin last Thursday.

The bill would free most AT&T data communications services from government regulation and allow the company to offer on-line as well as off-line computer-based information services.

A small coterie of opponents probably will try to delay the debate, but they are not likely to be successful. It also appears likely that S. 898 will be passed by the Senate, even though it contains several provisions that telecommunications users and AT&T's competitors oppose.

However, before a rewrite of the 1934 Communications Act can be enacted, it must be approved by the House of Representatives, and there the foes of S. 898 appear to have more strength.

One indication is the critical report issued by the General Accounting Office (GAO) last month [CW, Sept. 28]. Commissioned by a subcommittee of the House Commerce Committee, the group responsible for telecommunications legislation in that chamber, the report said competition is not sufficient to justify deregulation of AT&T and the separate subsidiary structure specified by the Federal Communications Commission (FCC) in its Second Computer Inquiry Decision will not reduce AT&T's anticompetitive incentives. GAO also said the FCC has failed to determine the phone company's true costs and has not implemented the accounting procedures needed to allocate those costs fairly.

S. 898, according to its critics, doesn't adequately address any of these shortcomings. For example, it allows AT&T to establish the very sort of "single, conglomerate" subsidiary — offering both enhanced services and equipment — explicitly criticized in the GAO report. Also, despite last-minute efforts by Tele-Cause, one of the lobbying groups organized by foes of S. 898, the bill's provisions concerning deregulation were not changed significantly.

As S. 898 went to the Senate floor, it provided for deregulation of any AT&T communications offering, other than a "basic" service, six months after the FCC finds that competition is adequate in the related market. The commission has two years from enactment of the legislation to make this initial decision.

But users are worried that this process will result in the deregulation of Wats and private-line services; so are specialized carriers and suppliers of computer-based information services who are dependent on both Wats and private-line offerings. All three groups wanted a longer transition period written into the bill. They also wanted the bill to define "adequate" competition.

Quick Deregulation

Rep. Tim Wirth (D-Colo.), chairman of the House Telecommunications Subcommittee, made it clear in a recent speech to the Tele-Communications Association (TCA) that he believes S. 898 will deregulate the industry too quickly [CW, Sept. 28]. A report likely to be released this week by the subcommittee is expected to show the level of competition in the telecommunications industry, market by market. According to knowledgeable sources, the basic aim is to refute the phone company's contention, expressed on Capitol Hill and in numerous state regulatory proceedings, that if some competition exists in a particular market, it is enough to justify deregulation. Wirth and his colleagues reportedly plan to write a bill requiring specified evidence that adequate competition exists before AT&T is allowed to market products and services on a deregulated basis.

During hearings recently held by Wirth's subcommittee, spokesmen for telecommunications users said one of their big concerns was whether the "fully separated affiliate" (FSA) established by S. 898 would be allowed to own transmission facilities and offer "cloned" services — that is, services identical to those provided by the regulated side of AT&T. Such an arrangement would permit "AT&T to deregulate through the back door," as one user group's attorney put it; the FSA could establish an unregulated clone of a service, such as Wats, and AT&T could then let the regulated service deteriorate so users would be forced to transfer to the FSA.

S. 898, as it went to the Senate floor last week, would allow the FSA to own and operate transmission facilities and to offer cloned services.

The bill also included two amendments proposed by the Department of Justice and supported by the Reagan administration.

One is intended, according to its proponents, to provide specialized carriers and AT&T's Long Lines Division with equal access to the Bell network. Among other provisions, it would permit a user to reach a specialized carrier's intercity switch using the same number of digits required to access an AT&T toll center.

The second Justice Department amendment would require AT&T operating companies to purchase specified percentages of equipment from sources other than Western Electric.

Last summer [CW, Aug. 31], Attorney General William Baxter told the Senate Judiciary Committee that if these two amendments are enacted, the government will drop its antitrust suit against AT&T. The phone company's competitors appear likely to oppose the amendments.

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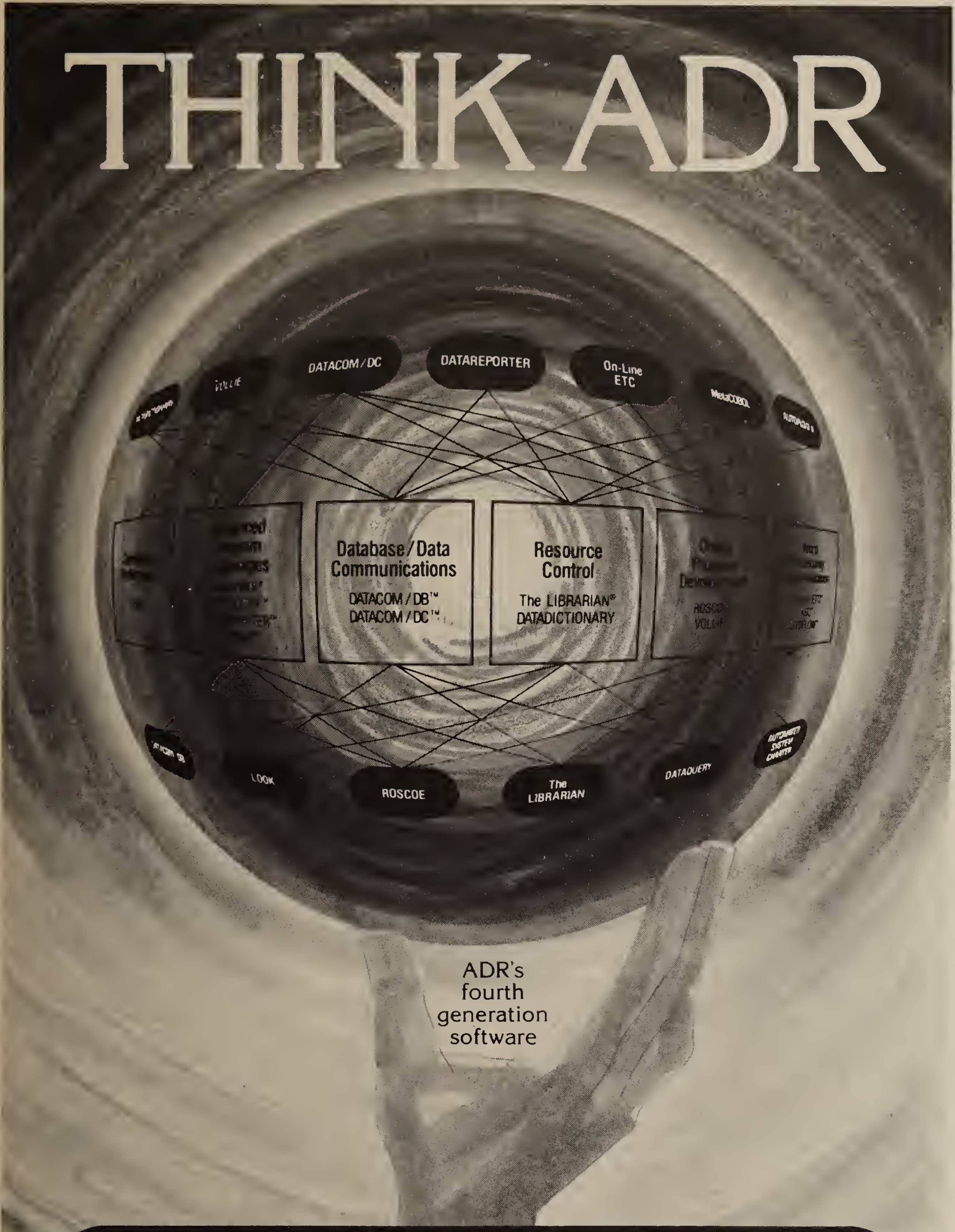

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Cullinane Ties 14 Products Into 'IDMS-1982'

(Continued from Page 1)

Costing $15,000, Escape was designed to allow users to move to IDMS without conversion and thus "protects a significant investment in application code," Cullinane said.

DDS "is a complete rewrite of our distributed data base product," he continued. It supports shared data bases and data base machines, allowing data to be placed anywhere within a network and accessed by programs in multiple locations. This means that network planners will no longer be required to balance data base resources in order to accommodate change, according to Cullinane. DDS is priced at $30,000.

IDMS-1982 also includes the integration of three application products to Cullinane's DBMS. These are the Cullinane Integrated Manufacturing System (Cims), a Customer Information System (CIS) designed for banks and a general ledger system.

Closed-Loop System

Cims can operate as a closed-loop system, allowing on-line job-status inquiry and process modifications to let manufacturers fine-tune applications to meet changing needs. It consists of eight modules and is priced at $250,000.

The first three modules — bill-of-material, inventory control and material requirements planning — will be generally available by March, according to Robert Goldman, senior vice-president.

CIS, priced together with IDMS at about $200,000, was introduced earlier but has been "fully integrated" with the DBMS and is now available for general distribution.

The general ledger system, costing $75,000, was recently acquired from McCormack & Dodge, Inc. It will be initially installed at Cullinane's data center to handle internal accounting requirements and is scheduled for general release in nine to 12 months.

Again stressing the integration aspect of this announcement, Goldman noted that Cullinane's future plans include tying in various accounting functions such as accounts payable and receivable processing.

New IDMS Release

New releases of IDMS and its components are IDMS 5.7, featuring relational views of the data base and full support of Vsam files; Integrated Data Dictionary (IDD) 3.0; IDMS Data Communications (DC) 2.0, a teleprocessing (TP) system featuring improved statistics-gathering, printer support and security facilities; and On-line Query 3.0;

Also, a version of On-Line English, which allows direct access of IDMS data bases; Culprit/EDP-Auditor, including a special version of the auditor that features a library of generalized audit routines for tasks such as confirmations, file footing and exception analysis; an updated release of the Interact text editor; and Release 2.0 of Cullinane's Universal Communications Facility, designed to allow an IDMS application to run under any TP monitor.

IDMS and its integrated systems components range in price depending upon user requirements and application considerations. A complete data dictionary-driven version of IDMS is available for a license fee of $102,000 and can go up to $300,000 depending on application development and end-user access tools selected.

Cullinane is at 400 Blue Hill Drive, Westwood, Mass. 02090.

'ADS/On-Line' Spotlighted

(Continued from Page 1)

necessary processing logic.

Four features — on-line application definition, a high degree of modularity, high-level processing facilities and compatibility with Cobol and PL/I — combine to simplify and speed application development execution, Cullinane said. Product features include:

- Interactive definition of screen formats, prompts and messages.
- Automatic creation of the application menu screen. As a security measure, the menu shows only those applications a given user is authorized to execute, a spokesman noted.
- A reporting facility for records and all ADS/On-line definitions to assist with application definition and maintenance. Both on-line and batch reports are available.

Available for general release during the first quarter of 1982, ADS/On-line costs $30,000 from Cullinane at 400 Blue Hill Drive, Westwood, Mass. 02090.

RIS Exec: What Programmer Shortage?

(Continued from Page 1)

RIS executive who was sent to England on a company project and hired 10 people in just one week through newspaper want ads. "England is a very depressed market," he noted. Since no agency fees had to be paid, he estimated the company spent about the same amount to bring someone over from England as it would cost to go through a San Francisco-based agency to hire a $30,000 programmer/analyst.

The type of person who is willing to relocate is usually the same person who is "easiest and cheapest to move," he said. Single people who rent apartments, for example, are highly mobile.

Standard Scenario

RIS managers are always on the lookout for potential employees, Bortman noted. The standard scenario before leaving the corporate offices for a client visit or conference includes letting the in-house professional staffer know where the manager will be traveling. "She gives us the resumes from those areas" and recruitment thus becomes an on-going part of the manager's trip. "I interview as I travel," he said.

RIS built and installed just 18 systems between 1973 and 1980. However, things have speeded up to where it is currently developing 12 systems in-house. "That's why we had a hiring push." During the last three months, "I personally have been responsible for hiring 25 people," Bortman said. "So how can anyone say there is a programmer shortage?"

He takes the position that searching for system developers is rather like filling in a football team. "They can't all be superstars," he said. The overall aim of the firm is to develop a "core of talent" that will stay with RIS for years.

Programming Programmers

There is a real need for "programmers who want to stay programmers," according to Bortman. "I love to hear a programmer say 'I don't want to be an analyst and I don't want your job.' " And there is no reason why such a career decision should mean economic sacrifice, he said. Bortman would like to see the programmers' salary scale escalate along with that of the manager. "Why not a $50,000 programmer in the future?"

He also looks for energy, enthusiasm and good communication abilities during interviews. "Even systems programmers have to be able to talk."

Location in an appealing city and the ability to offer work in a "state-of-the-art on-line development mode" gives RIS an edge with some programmers. However, he felt that his hiring approach would also work for more traditional companies.

But RIS doesn't always win the hiring sweepstakes, he admitted. Banks, for example, can offer other inducements, he said, recalling at least one time that the development house lost a programmer to a bank that offered him a low-interest mortgage.

Ocrua Conference Set for Jan. 24-27

DENVER — The Winter Conference of the Optical Character Recognition Users Association (Ocrua) will be held here Jan. 24-27.

The theme of this year's conference is "How Economics Can Impact OCR Growth." Sessions will cover inroads against OCR at State Farm, OCR in office applications and a four-part series on OCR forms, economics and rejects.

Registration costs $280 for people from member companies and $350 for nonmembers. Additional information is available from Ocrua, Battenkill Arcade Building, P.O. Box 2016, Manchester Center, Vt. 05255.

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GSD to Offer Code Developed Outside IBM

ATLANTA — Following a trend set by the Data Processing Division with the IBM Personal Computer, IBM's General Systems Division (GSD) is starting a publishing department that will offer externally developed software through the firm's marketing channels.

The external submissions department is effective immediately and nomination forms are available on request. The forms, a spokesman said, include detailed submission information and an extensive rundown of the rules.

Submissions can include any type of applications software that IBM does not currently produce. Industry-specific and cross-industry nominations are welcome, as are conversion aids and productivity aids. The programs can operate alone or with IBM licensed programs.

Proposal Needed

Program authors are asked to first submit a proposal (without code and documentation) to IBM, which will be reviewed by an external submissions committee. If the program is unacceptable or if IBM has a similar offering pending announcement, the idea will be rejected. Keeping with its policy of not preannouncing products or speculating on what the firm will do at a future date, a spokesman said some ideas may get a polite "no" without a specific reason for denial.

Those who do submit programs must be able to meet certain requirements. The submitted program must be operating successfully on a GSD system in multiple customer locations. The program must be transferable, installable and maintainable (by the submitter) and the submitter must be able to provide support directly to the licensed user.

In addition, the submitter must be able to prove that he has ownership of the software and that he has the authority to enter into a marketing agreement with IBM. The submitter also must be willing to do so on a nonconfidential basis, a spokesman said.

Submission forms are available by writing to Manager, External Submissions, IBM Corp., Old Orchard Road, Armonk, N.Y. 10504.

Packaged Software Topic of Conference

SAN FRANCISCO — The San Francisco National Packaged Software Conference will be held at the Hyatt Regency here Oct. 26-28, AMR International, Inc. announced.

Forty-four major software vendors will be making one-hour presentations on their most successful software packages, AMR said. The conference format will include 96 product presentations covering financial administration, manufacturing, electronic office, scientific utility software and data management.

The registration fee for the conference is $395. Further information is available from AMR International, Inc., 1370 Ave. of the Americas, New York, N.Y. 10019.

For Mid-Range CPUs

Burroughs Unwraps Front End

DETROIT — Burroughs Corp. has unveiled a front-end data communications processor to run with its B2000, B3000 and B4000 medium-range processors.

The CP 3680 is said to support up to 2,000 terminal stations and up to 2,000 transaction types. It can also simultaneously provide support for up to four Burroughs hosts, allowing any terminal in the network to communicate with an application program on any host system.

Existing Burroughs Network Definition Language (NDL) applications and those utilizing the CP 3680 message control system can be run concurrently. Current users of the Burroughs B874 communications processor will not have to recompile application programs to run with CP 3680 systems in most cases, the company claimed.

The basic CP 3680 is equipped with 256K bytes of error-correcting main memory and 20M bytes of disk storage.

An integrated message control system offers message queueing, message routing, message security, forms generation and forms service.

Users requiring continuous on-line operation can install a CP 3680-01 "hot standby" redundant processor along with the CP 3680. If the active model becomes unavailable, the "hot standby" system will automatically assume control of the network and all input/output interfaces to the host computer.

Because application software is insulated from the external network environment, changes can be made in network configuration and types of terminals without affecting application programs.

Purchase prices for the CP 3680, including required software, start at $81,650; monthly lease prices start at $2,970 on a three-year contract. Prices for the "hot standby" CP 3680-01 are $65,500 for purchase and $2,450 for lease on a three-year contract.

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In Defiance of Justice Ruling?

IBM Reshuffles U.S. Setup Into Three Groups

By Tom Henkel
CW Staff

ARMONK, NY. — IBM is a new company this week.

The firm revamped its U.S. operations last week in a move to streamline its sales and marketing efforts and to resolve long-simmering internal conflicts between division sales reps.

Some industry observers see another reason for the IBM shuffle. The move, they say, is in defiance of the U.S. Justice Department, which has been pushing IBM toward fragmentation under federal antitrust laws.

All marketing and service divisions have been consolidated into one group. Development and manufacturing divisions have been restructured into two groups.

The marketing and service divisions are now part of a single group management called Information Systems Group (ISG). This group includes the Data Processing Division, General Systems Division, Office Products Division, Federal Systems Division, Customer Services Division and Field Engineering and Information Records segments.

There will be two marketing groups within ISG, but IBM has not stated exactly how IBM customers will be allotted to them. Some observers say one group will be for big users and one for smaller ones; others say the division will be based on regional factors.

Each of the marketing groups will be able to sell IBM's spectrum of products, from the top-of-the-line 3081 to office products such as typewriters. The move is said to eliminate conflicts that sometimes came up when both GSD and DPD sales reps found themselves courting the same customer with different systems. It also allows IBM customers to deal with one sales rep for all products, not three or more, which had been the case before the announcement.

ISG will be headed by C.B. Rogers Jr., IBM vice-president and group executive.

The two groups formed for development and manufacturing include one making large systems (the Information Systems and Technology Group) and another for smaller systems, communications products and office products (the Information Systems and Communications Group). Each group will be responsible for all software and peripherals connected with its coverage area.

The Information Systems and Technology Group will produce all large processors and peripherals as well as all semiconductors. The division will produce the 4341 up to the top-of-the-line 3081, as well as handle the older 370 line of processors.

Information Sytems and Technology is comprised of the Data Systems Division, the General Products Division, the General Technology Division and the East Fishkill, N.Y., and Burlington, Vt., semiconductor manufacturing facilities. This group is headed by Arthur G. Anderson, IBM vice-president and group executive.

The Information Systems and Communications Group will handle virtually everything else IBM makes. It incorporates the Communications Products Division, the Information Products Division and the Systems Products Division. It will be headed by John F. Akers, IBM vice-president and group executive.

The Information Systems and Communications Group will produce all smaller IBM systems, from the 4331 on down to office and peripheral products.

Analysts say the announcement indicates IBM is flexing its muscles as the No. 1 computer maker and is trying to become even more competitive. "IBM is getting lean and mean," one analyst said, while another said the reorganization may prolong IBM's 12-year-old antitrust suit with the U.S. Justice Department.

Users to Get IBM 3380s a Year Late

(Continued from Page 1)

agree the problems center around the thin film heads sticking on the disk media.

The solution was to design a medium thin enough, and slippery enough, to allow the thin film heads to pass freely. IBM announced last March that it was suspending first shipments of the drives indefinitely until it solved the problems.

In its most recent announcement, IBM said some 3380s will be shipped in the latter part of this month, but most users will wait another seven months before actually seeing the drives. Some analysts feel IBM made a hurry-up effort to deliver some drives this year in an attempt to save face, but deliveries will not really start until 1982.

While it was having problems with the 3380s, IBM was also experiencing an unexpected surge in 3350 orders. When the March delay was announced, the market blew up. IBM was swamped with 3350 orders as were plug-compatible manufacturers (PCM) making single- and double-density versions of the 3350. As a result, IBM had to step up production of 3350s to fill the demand.

Now IBM said it has successfully resolved the 3380 problems, but industry sources are skeptical. Some say there are still some minor problems with the drives, while others say the 14-month delay means IBM has solved the problem, but has to figure out a way to implement the solution on the San Jose, Calif. assembly line.

Reduced Shipments in '82

The Gartner Group's Peter Wright and PCMs making competitive double-density 3350-type drives said IBM will only be able to ship about half as many 3380 spindles as it originally planned in 1982.

Wright estimated IBM will ship about 14,000 3380 spindles during 1982 as compared to an estimated 30,000 originally planned. And he contends IBM is still having problems creating adequate media for the drives. The Gartner Group estimates it will take IBM until the third or fourth quarter of 1982 to reach peak 3380 production.

The PCMs are quite happy with IBM's announcement. The 14-month delay means that IBM probably will not be up to peak manufacturing capability on the 3380s until the end of 1982. That means firms like Control Data Corp., Storage Technology Corp. and Memorex can all market double-density 3350-type drives for another year. In addition, the delay gives those firms at least another year to work on a 3380 type disk drive, according to one PCM.

Faced with a 3350 overbooking problem for the first half of 1982, IBM said it might have to delay 3350 deliveries two to six weeks if something does not give. To avoid that, a spokesman said IBM is offering a deal.

It takes four 3350s to equal one 3380. Therefore, IBM has set aside an unspecified number of 3380s for users with both types of drives on order.

If a user with 3350s scheduled for delivery between October and mid-1982 is willing to postpone or cancel four 3350 deliveries until the second half of 1982, IBM is promising those users will get an improvement on their 3380 deliveries.

The move appears to be an effort to eliminate paper orders for 3350s that will probably never be filled. The orders were placed by frantic would be 3380 users last spring when it appeared clear IBM could not deliver the 3380s on time. Those users might be willing to cancel 3350 orders in order to get a better delivery on a 3380.

But analysts are skeptical of this move too. The Yankee Group's Gerard Hallaren said 3350s are still hot sellers and will probably remain hot for at least another year. Users with early 1982 deliveries of 3350s could conceivably buy the drives and sell them to a third party and make a handsome profit.

"It was bad or worse than anyone had expected," International Data Corp.'s Jack Hart said. "They're going to suffer for this," Hart added, saying IBM's 1982 revenues may be severely impacted by the delay.

IBM said the extra delay was a result of the technical problem, the testing necessary to solve it and the unexpected rush on the 3350 market when the delay was announced.

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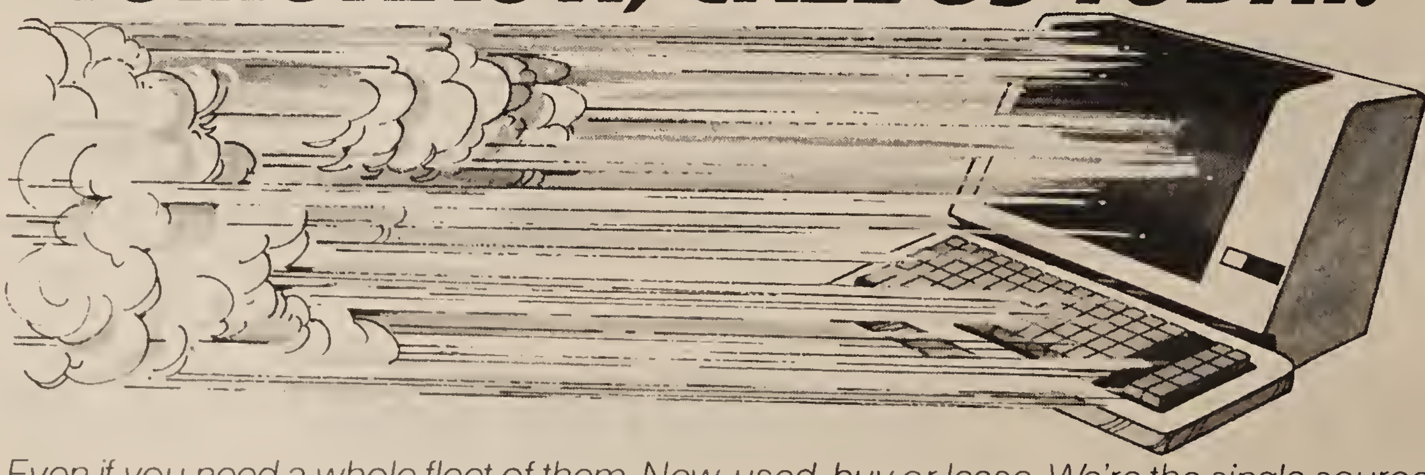

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NAS-IBM Software Pact Covers Licensed Products

(Continued from Page 1)

been sent to other PCM vendors offering a similar arrangement. Although IBM asked in the letter for a reciprocal arrangement on the lines of the NAS deal, the IBM spokesman said such a requirement is not essential.

"This arrangement has a considerable advantage for PCM users because it means an MIS manager has a greater array of software products to choose from. Users are steadily being unlocked from one vendor's software. They can now start mixing and matching software on their hardware," Martin said, adding, "Although this has been true for some time, users have been reluctant to count on it. Now they know they can have access to a greater number of options to run on their CPUs irrespective of the origin of that CPU."

NAS sees productivity benefits such as increased throughput or a decrease in the amount of overhead costs required to carry out a particular application to be reaped from the new arrangement.

For example, IBM has a number of licensed software packages associated with the MVS operating system, which runs on several of its machines including the 3033. The licensed software supports performance increase on that system that NAS claimed would now also be available to users of its AS 9000 large system.

As part of the reciprocal arrangement reached with IBM, NAS will in return offer IBM 3033 users access to Extend, its licensed software tool, which until now has been available only to AS 9000 users.

"This arrangement clearly eliminates one of the biggest obstacles to the matching of IBM-compatible mainframes," Martin said. "Up until now, if you bought a CPU other than from IBM, you were less favorably treated by IBM. That will now disappear as a consideration when a user chooses what equipment he wants to buy."

A spokeswoman for Amdahl Corp. welcomed the IBM announcment. Amdahl sees it as an opportunity to expand on its own software usage since it is already maintaining IBM software on some equipment, the spokeswoman said.

Why Did IBM Do It?

There appears to have been two primary motivations for IBM's decision to make its licensed software universally available, according to industry observers.

First, IBM recognized the large software market available in the plug-compatible mainframe (PCM) field, which has a user base second only to its own. Cross-licensing agreements have been a typical IBM approach to tapping competitors' markets when it decides it stands to gain more in return than what it is giving up. In this case, IBM will gain access to its competitors' software markets.

As one senior industry executive put it, "When an area evolves which is important . . . [IBM tends] to single out the major players in the field and go in for cross-licensing deals. IBM has at last given up its five-year-old tactic of trying to make the PCM industry go away."

The second apparent reason for IBM's decision to make its licensed software universally available is that NAS, which has often and bitterly complained about IBM's refusal to give its users immediate access to IBM licensed software, has withdrawn the complaint it filed against IBM in the European Commission of the European Economic Community as part of an antimonopoly campaign. This reduces the chances of that campaign being successful, since NAS was one of the major protagonists.

Cincom Users To Meet Oct. 25

CINCINNATI — Cincom Systems, Inc. has expanded its national user conference and is initiating regional conferences for the first time.

Scheduled for Oct. 25-30 here, the three-day national conference was expanded to five days in order "to provide special attention to both management and technical concerns," according to Thomas Nies, president of the independent software development firm.

The first two days of the conference will be geared exclusively to management. Day three will feature a feedback session and the last two days will be devoted to in-depth training on utilizing specific product technologies and methodologies.

Between four and six regional user conferences will be set up in the U.S. and Canada. More information is available from Cincom at 2300 Montana Ave., Cincinnati, Ohio 45211.

Correction

"The Human Network" [*Computerworld Extra!*, Sept. 1] was mistakenly attributed to Harry Viens. The article was written by Peter Broderick, manager of creative services at Wang Laboratories, Inc.

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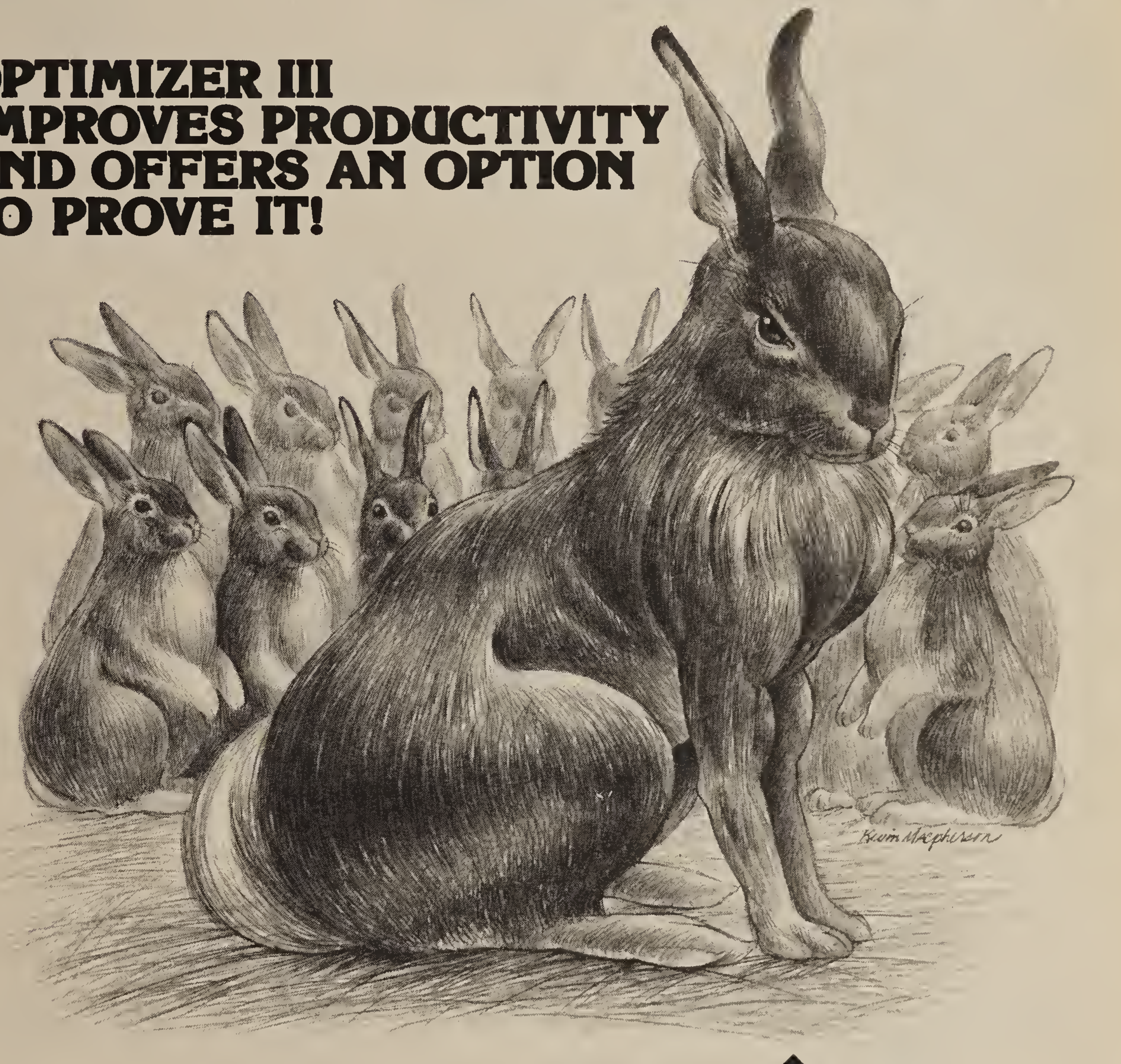

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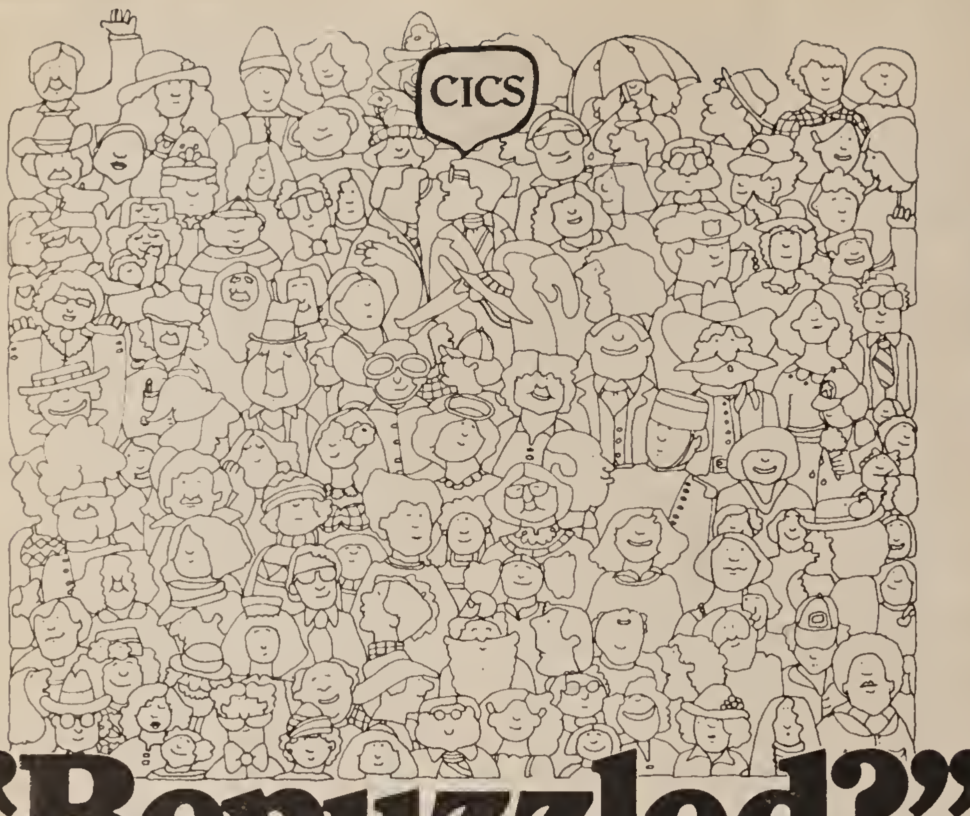

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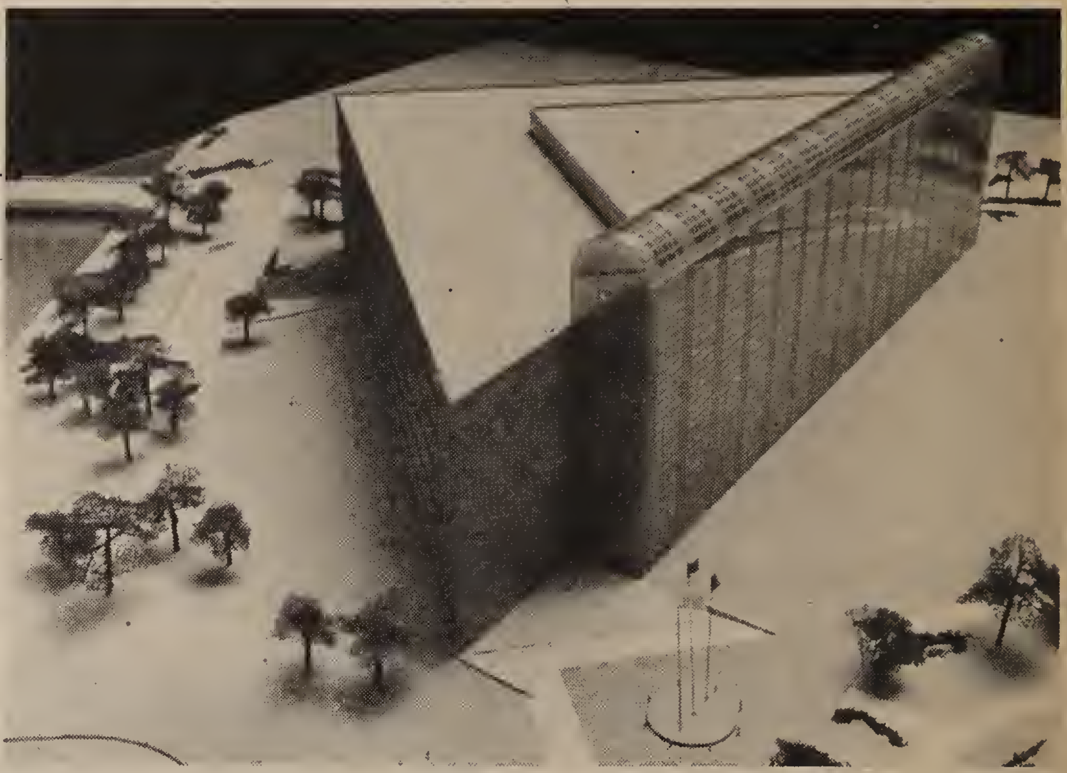
Dallas to Break Ground For First DP Trade Center



Proposed International Information Center

By Bill Laberis
CW Staff

LAS COLINAS, Texas — A mid-December groundbreaking is scheduled in this Dallas suburb for what is being touted as the world's first trade center for the computer industry.

Once completed, the International Information Center will give users a one-stop shopping location for all their computing needs, from hardware and software to systems support and telecommunications, center developers claimed.

Set on an 18-acre site, the center will house up to 250 vendor displays when completed in the spring of 1983. Developers say the complex, which covers 535,000 sq ft, will provide users and vendors with a cost-effective, permanent trade tool.

The developers are also hopeful that users will flock to the $60 million center for various user group meetings and that vendors will use it as a headquarters for unveiling and displaying new products.

Giant Computer Room

"It will be like a gigantic computer room in design, the biggest in the world, I'm sure," said Brad Griffith, senior vice-president with Leggat McCall & Werner, Inc., the center's Boston-based developers. "Based on our market studies, it is something whose time has certainly come."

Griffith and Mark Kisiel, also a senior vice-president, have spoken with "virtually every major computer vendor" about the center, all of whom were "extremely enthusiastic." The developers said they have received verbal commitments for one-third of the planned display area including commitments from "all the major hardware vendors."

Short-term leases will be written, reflecting the rapid changes taking place in the industry, the developers said. They anticipate leasing all of the vendor space by the time the center opens, approximately 18 months after construction begins.

Spokesmen for the developers said they are "putting the final touches" on their financing package for the center, but refused to comment further on the arrangements. They admitted there are "a few more hurdles to clear before construction starts, but no barriers."

The center will be enclosed in a five-story stone and glass building shaped like a large right triangle with a long, silo-shaped glass addition running along the hypotenuse.

The plan is to wire the entire center with conventional wiring and then let tenants rewire with coaxial cable if they so choose. All leased vendor spaces, none larger than about 20,000 sq ft and few smaller than 1,000 sq ft, will feature raised "computer flooring" — 325,000 sq ft in all.

Window light from the glassed-in addition will illuminate a 25,000 sq-ft atrium (about half the size of a football field) in the shape of another right triangle within the main triangle. This area will be reserved for user group meetings and temporary displays. Anyone standing in the atrium will be able to look up and see all the vendor cubicles tucked into the multilevel display area rising 96 ft from the atrium floor.

The "IBMs, Honeywells and other big companies" will definitely not be grouped together, the developers said, but rather scattered throughout the display area. Interspersed will be the medium-size and smaller size vendors, with only one special product section planned now; that one will accommodate software vendors.

Lease information is available from Leggat McCall & Werner, Inc., 60 State St., Boston, Mass. 02109.

Briefings on Ada Set

MADISON, N.J. — Two technical briefings on the Ada language will be conducted this month by Kenneth C. Shumate, technical director of the California division of Softech, Inc., one of Ada's developers.

The two-day briefings, entitled "Ada: A Technical Briefing for Managers and Senior Data Processing Personnel," will be held in Washington, D.C., Oct. 13-14 and in New York Oct. 15-16.

The fee for the two-day briefing and course workbook is $545. Further information can be obtained from the American Institute for Professional Education, Carnegie Building, Madison, N.J. 07940.

In Wake of Federal Cuts, Rising Costs

Scholarship Matching Services in Demand

By Bill Laberis
CW Staff

Computerized scholarship services have come to the aid of students and parents reeling from soaring tuitions and huge federal cuts in higher education funding.

The services, some claiming data bases bulging with "how-to-get" information on more than $500 million in private foundation scholarships, all report dramatic increases in user interest in recent months.

Despite the services' efforts to match donors with recipients, nearly $140 million in private foundation scholarships went unclaimed last year largely because no one applied, according to the nonprofit Counsel for Financial Aid for Education in Washington, D.C. That is enough aid to provide 25,000 students with a full year's average school expenses.

Tough Competition

"Obviously competition for scholarships is going to really heat up," said Robert Freede, president of Scholarship Search in New York. "The pressures on middle-income families resulting from $8,000 and $10,000 annual school bills is just tremendous."

For a $67 fee, the 10-year-old company will cull 10 to 30 possible sources of funding from its data base of 250,000 different scholarships, most from private sources, Freede explained.

Source selection is based on a lengthy questionnaire designed to narrow and refine the scholarship selection process and includes the student's choice of 249 major areas of study.

The selections are printed and mailed to the student, along with complete descriptions of the scholarships and application information. Freede guarantees at least one "good" scholarship source will be cited or the fee is refunded.

The heart of his operation is an IBM System/34, with the voluminous data base stored on disk file and accessed and updated via several on-line terminals, he said.

During rush periods he employs an outside service bureau, as well as contract programmers for file maintenance.

Scholarship Newcomer

National Scholarship Research Service of San Rafael, Calif., is a relative newcomer on the scholarship service scene. Daniel J. Cassidy, company founder and president, is a 25-year-old Yale graduate who said he easily financed his graduate and undergradute education by combing through hundreds of private endowment offerings.

Cassidy's service caters to both undergraduate and postgraduate students and expects to process nearly 10,000 student aid applications this year for $40 apiece.

The company's data base holds information on 50,000 scholarships, most from the private sector. About 80% of these require no proof of financial need, he added.

Cassidy's clients complete a 37-question application form in which the student checks off one or more of the 20 fields of study listed, in addition to listing other pertinent information.

In return, the company sends out no less than 20 possible funding sources, including directions for applying.

The company operates with a network of 14 Apple Computer, Inc. microcomputers connected via a key random-access method to a 30M-byte Corvus Systems, Inc. disk drive, which holds the data base. The student printouts, produced by batch processing, are handled by the company's Texas Instruments, Inc. 810 and Okidata Corp. high-speed printers.

What kind of student gets the scholarships?

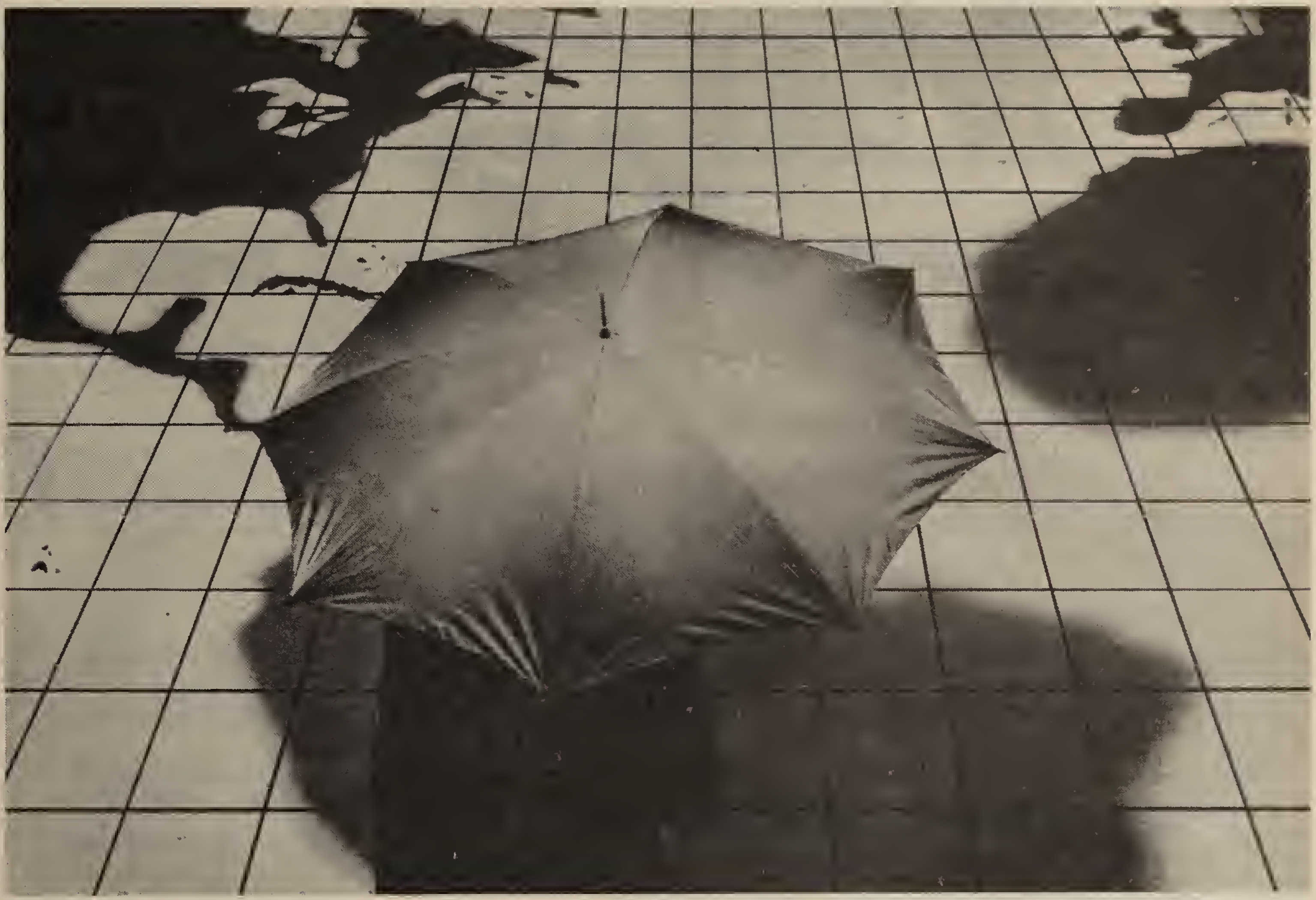
"Ancestry is very big and so is union affiliation and religious preference," Cassidy said. "There are some real oddball ones waiting for the right people, like one I heard of recently reserved for people with one blue and one brown eye."

Offbeat Scholarships

Other more offbeat scholarships included in Cassidy's files are:

- The Eisenhower Memorial Scholarship Foundation of $8,000 for students "who have never attended college and have faith in the Divine Being, the free enterprise system and the American way of life."
- Bucknell University's $30,000 fund to be divided among eight students who "don't use alcohol, tobacco or narcotics or engage in strenuous athletic contests."
- Yale's $1,000 awards awaiting students named DeForest or Leavenworth.

Other computerized scholarship services are Scholarships Unlimited in Phoenix, Ariz., which includes in its data base a scholarship for descendents of Confederate soldiers and Student College Aid of Houston, run by quadriplegic Ed Rosenwasser who operates out of his home.



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SSA's DP Staff Slammed for System Troubles

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Social Security Administration (SSA) DPers got a good swift kick in the teeth last month when they were loudly blamed for most of the troubles besetting the agency's overburdened and obsolete computer systems.

According to representations by past and present SSA officials to a Sept. 23 congressional hearing, agency DPers are short on education, technical skills and talent — short on everything but hard work, dedication and loyalty. These latter, Congress was told, are the only reasons the systems have not disintegrated completely.

Although "hardworking, concerned and devoted to the success of their mission," most of the SSA systems staff "lack, to a great extent, the technical skills to perform systems design, systems planning, systems development and systems maintenance activities," according to Rhoda R. Mancher, former director of SSA's Office of Systems Development.

Mancher, who left the SSA post a year ago, said a majority of the staff "understands the claims process — period." Of the 400 professionals on her staff, there were approximately two dozen with advanced degrees, none of them in relevant subject areas, she said.

"At the time of my arrival [June 1979], no division chief in the Office of Systems Development held an advanced degree; all were high school graduates," Mancher told a House Government Operations subcommittee [see accompanying story].

1960s Environment

Describing the agency's computer operations as a "1960s environment," Mancher said, "It has the characteristics of an emerging computer technology frozen in time. Many programs are written in machine code, the majority of processing is initiated with card input in batch mode and most of the files are stored on magnetic tape."

The SSA, she said, "has behaved like Rip van Winkle."

Efforts to correct systems deficiencies were met with staff resistance, according to Mancher, who told of one young and capable programmer who was brought in only to be "frozen out" soon after by "the old-timers."

That resistance, coupled with a lack of upper management support, prompted her to resign out of frustration, Mancher said. She complained the staff insisted on promotion from within even when not qualified. The DP operations, she said, are "a very ingrown atmosphere [with] very little outside contact.

"You can't have a whole staff of clerks" who have been given a six-week Cobol programming course, Mancher said, claiming "the last straw" for her was continuing threats of sabotage of the computer systems from within.

Supporting Mancher's claims was Dr. Jan Prokop, former associate SSA commissioner for systems, who said, "I am appalled, absolutely appalled, at the notion of individuals within an organization sabotaging their own organization."

According to Prokop, "the [SSA] problem is not the conventional wisdom of having too few people, but rather one of too many people at too low a level of practical ADP professional skill."

Prokop, who called the personnel problems the most difficult facing SSA, said training is not the answer because high-level employees cannot be given "the years of contemporary knowledge and experience needed in the confines of a training program."

Recruiting new people, on the other hand, is also difficult because SSA systems are so fouled up that the agency does not offer an attractive professional challenge to quality DPers, he said. The location of the SSA facility in the suburbs of Baltimore also hinders recruitment, he added.

Archaic Software

SSA Commissioner John A. Svahn pointed a finger at the archaic and undocumented software for the low level of programmer productivity at the agency. SSA programmers maintain an average of only 22,000 lines of code, compared with a 60,000-line figure he said the DP industry considers a good productivity level.

Over the past year, SSA has lost approximately 20% of its programming staff — more than 100 people, Svahn reported. And the agency has a "severe shortage" of systems analysts.

"There is a very serious morale problem throughout the agency, but particularly in the office of systems," he said. And that makes it tough to recruit because the system "does not offer a professional challenge, just a challenge.

"Along with less pay," Svahn said, "SSA offers poorly designed, undocumented software that is impossible for an outsider to understand, old machinery and antiquated operations."

Given this situation, which Svahn termed "virtually a national disgrace," Svahn said the SSA staff should be complimented for keeping the checks going out on time. "My hat's off to them."

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'Impending Disaster' Near?

SSA Defends DP System Before House Group

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — While White House budget cutters mulled further cuts to Social Security benefits, Social Security Administration (SSA) officials faced a more immediate problem. They are trying to assure Congress the agency's troubled computer systems will somehow continue to get the checks, reduced or not, in the mail on time.

Facing a skeptical House of Representatives Government Operations Subcommittee Sept. 23, high-ranking administration officials spent several largely unpleasant hours beating back suggestions that the SSA's massive DP operations face "imminent collapse" or at the very least "impending disaster."

The agency's DP problems are not new; they have been growing for the last 10 years. General Accounting Office (GAO) auditors and General Services Administration (GSA) management specialists have been harping on the problems for about as long as anyone can remember.

And the problems are considerable:

- Aging hardware relying on outmoded magnetic tape storage methods.
- Undocumented software.
- Obsolete operating systems and applications programs.
- Inadequate security arrangements.
- A shortage of programmers and systems analysts.
- An underskilled and demoralized staff.

Success or Failure?

Despite these and other problems, SSA manages to deliver benefit checks to 36 million Americans month in and month out. Depending on who is telling it, this mission accomplishment in the face of rapidly deteriorating technical support is either one of the great successes of the computer age and due completely to hardworking, dedicated SSA DPers or is a monument to bureaucratic inefficiency and poor planning.

Both versions were well aired at last month's hearing before the House Subcommittee on Legislation and National Security. The panel is chaired by Rep. Jack Brooks (D-Texas), who wrote the book on government DP policies and practices.

According to Brooks, SSA is "now facing a situation where drastic action has to be taken to avoid impending disaster." This was not the first occasion that he has called SSA officials on the carpet for this decade-long problem, but Brooks has apparently not lost his enthusiasm for pursuing this "challenging" situation.

"Unless decisive action is taken to correct the deficiencies plaguing virtually every phase of [SSA] operations, we are heading for a day when the Social Security administration simply won't be able to get out the checks," Brooks said.

Particularly troubling to Congress is the prospect of SSA inability to program the tremendous changes required by Congress' recent decisions on minimum benefit computations for Social Security recipients.

According to SSA estimates, the changes could cost as much as $170 million, most of that going to manually reprogram the benefits of millions of Americans. It is, SSA Commissioner John A. Svahn conceded, "a national disgrace" that the agency cannot automate the recomputations.

However, Svahn said the system is not facing a complete breakdown, but is rather confronted with a gradual and steadily increasing backlog. He did not argue against the contention the system is operating "on the edge," but said developing a long-term solution to the problems is his "top administrative priority."

GSA officials, who are working with SSA to overcome its problems, backed Svahn's declaration of what he called "the beginnings of progress."

Frank J. Carr, commissioner of GSA's Automated Data and Telecommunications Services, pronounced himself "more encouraged today" than at anytime during the last 10 years that SSA will pull itself out of its difficulties.

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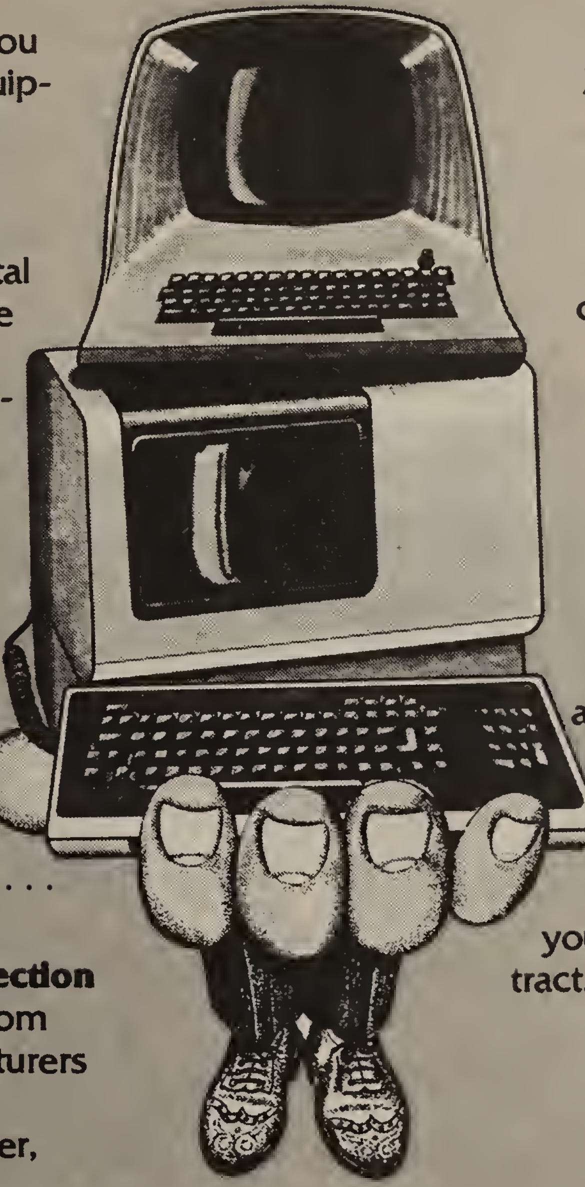

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Written by Pittsburgh Companies

Model DP Curriculum Welcomed by Colleges

By Brad Schultz
CW New York Bureau

PITTSBURGH, Pa. — Convinced that schools need to improve training of future DPers, 30 Pittsburgh companies wrote a model curriculum for DP and sent it this year to 21 universities and colleges.

The academic institutions have welcomed these guidelines, according to David A. Moore, chairman of the Pittsburgh Large User Group's (Plug) Education Committee. Plug consists of 30 companies that use large-scale IBM systems. Moore is also a vice-president of Mellon Bank.

Plug began monthly meetings on DP education about a year ago because academic programs did not seem to offer curricula well-suited to training the business programmers wanted in Pittsburgh.

Besides Moore of Mellon, the Plug meetings featured executives from U.S. Steel Corp., Gulf Oil Co. and the Aluminum Company of America (Alcoa), among other major corporations.

After agreeing that the education problem existed and was serious, "we said, 'What can we do about it?' " Moore recalled in a recent interview. The executives decided to write a model curriculum, with help from professional educators.

Twenty-one universities and colleges in the northeastern U.S. sent 42 educators to meetings of Moore's committee. "They bloodied us up and we bloodied them up," he said. But the model curriculum was written.

According to Moore, Plug's curriculum is not intended to "compete" with the DP curricula proposed by the Data Processing Management Association (DPMA) and the Association for Computing Machinery (ACM). The DPMA and ACM models grew from a realization that most of the nation's academic programs in computing have focused on the theoretical and experimental discipline of computer science, rather than topics germane to DP applications [CW, Aug. 17].

Plug also had that realization, Moore said, but wished to draft a model it could send directly to the universities and colleges that supply the Pittsburgh area's DP job market. Plug member companies employ about 5,000 DP professionals, largely graduates of those institutions. Plug wanted a model specifically tied to where their graduates seek employment, Moore indicated.

Outside Help

For its curriculum model, Plug tried to enlist help from the principal author of DPMA's model, Tom Athey, who chairs the information systems department at the California State Polytechnic University in Pomona. But Athey reportedly was unavailable.

However, as essentially an IBM users group, Plug did secure aid from technological instructors within IBM's Data Processing Division, and suggested two changes: further emphasis on systems maintenance and on system documentation. Otherwise, Moore declared, IBM "strongly endorsed" the Plug model.

The principal author of Plug's Business Information Systems (BIS) curriculum turned out to be Thomas A. Pollack of Pittsburgh's Robert Morris College. Pollack's design calls for the student to embark on a DP career with Introduction to Business Data Processing (BIS 101), which entails interactive programming in Basic.

After BIS 101, the student would take Cobol Programming (BIS 201) and choose from two electives, Assembler Language (BIS 212) and Basic/Fortran (BIS 210). After this extended exposure to programming languages, the student would ascend to the third tier of courses in Pollack's design: Advanced Cobol (BIS 301), Systems Analysis (BIS 302) and Computer Systems (BIS 303).

BIS 301 "requires the student to become proficient in the use of structured Cobol programming techniques for developing and processing sequential, indexed sequential and direct files," Pollack explained.

"In this course, the student is expected to develop an interrelated system of structured Cobol programs to fulfill the requirements of a selected business application."

Structured design techniques would be emphasized in BIS 302, as well as written and oral communication skills.

BIS 303 covers hardware and software aspects of computer architecture along with structures of programming languages.

After BIS 301, 302 and 303, the student would take Data Base Management Systems (BIS 401) and Data Communications (BIS 402), and could choose from two electives: EDP Auditing (BIS 412) and Simulation (BIS 410). After this fourth tier of courses would come the final course in Pollack's design, Management Information Systems (BIS 403).

Copies of Plug's model curriculum for DP education are available through Moore at Mellon Bank, Mellon Square, Pittsburgh, Pa. 15230.

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Info 81 to Open in New York Next Monday

NEW YORK — The Information Management Exposition & Conference — Info 81 — will highlight productivity techniques, information management, data base technology and small business systems when it opens here next week. The show will run from Oct. 12-15.

John M. Thompson, vice-president of Index Systems, Inc. in Cambridge, Mass., will kick off the eight information management sessions. Thompson will discuss the dilemma of the information manager and describe a company's typical DP resource in relation to the changing business and technical environment of the next five years.

Other sessions will discuss aligning information system strategies with corporate strategy, realistic tools for management planning and analysis, viewdata or videotext systems, computer graphics in executive decision making, integrated resource management environment planning and restructuring the internal systems consulting organization.

Producer's Motif

The conferences-within-a-conference motif instituted by Info 81 producers Clapp & Poliak of New York was designed to meet users' specialized needs. In addition to the general topics, conference sessions will also be geared to insurance companies, banks, finanical management, marketing and law offices.

Among the 11 sessions on DP management will be one entitled "Managing Organizational Change to Achieve Complete Systems Results." This session will consider methodologies for achieving benefits promised by new technologies.

Other DP management sessions will include human factors in interactive system design, procuring application software, computer capacity for new systems applications, human resources management to improve productivity in the DP organization and increasing productivity in the systems development process.

Seven sessions on data base technology and management are also scheduled. Highlighting these sessions will be one on "Relational Data Base Management Systems — The 'Query' System," chaired by Dr. Michel Melkanoff of the Computer Science Department at the University of California in Los Angeles. The session will provide an introduction to the "relational system approach," its primary areas of utility and a discussion of current implementations.

Other data base sessions will deal with the data dictionary directory system as a focal point for controlling the DP environment, administrative requirements for control and data integrity, audit and control of data base systems, data base methodologies in application development and implementation of data base supported systems environment.

Software Sessions

Sessions devoted to software will consider pre-packaged software in system applications, the uses of applications software, contracting for prepackaged software and software financial systems, marketing systems and materials management.

Info 81 will also present for the first time a special three-day conference on information mangagement for world companies. This conference will convene at the Plaza Hotel in New York, Oct. 13-15.

The separate Info 81 conference will feature a keynote speech by Dr. Richard Nolan, chairman of Nolan, Norton & Co. in Lexington, Mass., on "Information Systems for World Companies." Strategy planning, feasibility studies, implementation, shared information systems, financial, manufacturing and management systems will be discussed by participants who are building world systems for their own firms.

The Info 81 conference will be held Oct. 12-15 at the New York Coliseum and will cost $350 per registrant. The World conference is limited in size and will cost participants $1,000. More information can be obtained from Clapp & Poliak, 245 Park Ave., New York, N.Y. 10167.

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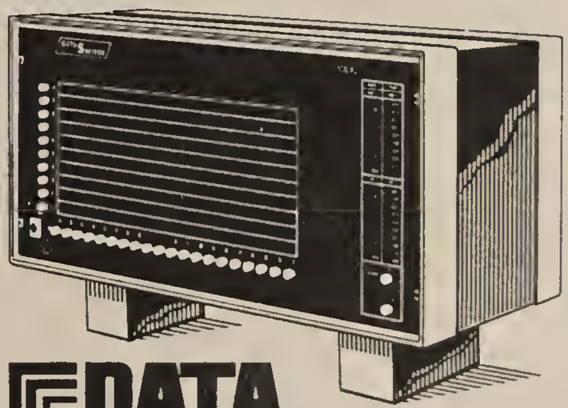

DATA SWITCH

Session on Human Resources Planned for Info

By Bob Johnson
CW New York Bureau

NEW YORK — How human resource management (HRM) can boost the productivity of DP shops will be discussed during a session at the Eighth International Information Management Exposition & Conference — Info 81 — here next week.

C. David LaBelle, vice-president of the Human Resources Operations Division of Manufacturers Hanover Trust Co. (MHT), the nation's fourth largest bank, is chairman of the session. He will address methodologies that he said will profoundly affect the way DP managers view their personnel.

LaBelle told *Computerworld* last week that the nation's productivity problem has been mistakenly directed at the worker. He plans to reveal to Info 81 attendees that the blame lies with management. "The issue of improving productivity directly relates to motivating people, which is the manager's job," LaBelle stated.

A participant at Info conferences for the last four years, LaBelle views this year's exposition as an excellent vehicle for the exchange of information related to productivity. He is particularly excited about sharing his views on HRM with other DP professionals in light of recent success he has had at MHT.

The human resources program he installed at the bank resulted in a 27% drop in turnover among systems and programming personnel in 1980. He projected that this figure will be cut in half — to about 14% — in 1981.

As part of his talk, LaBelle will discuss the specifics of his plan at MHT. He said the program brings computer personnel together with operations personnel to create an educational- and incentive-type environment. His crowning achievement at MHT, which he also feels is most important, was the creation of Japanese-style quality circles.

"I will try to share with Info 81 attendees how our quality circles are functioning. They are working. People are staying with the company because of what we are doing. They are turned on by having a say in what's going on and that helps productivity," he said.

LaBelle also said he will try to "cover the waterfront" of things to be done with human resources for the benefit of both worker and company. He mentioned such areas as cash bonuses, individual and team awards, working at home (electronic cottages) and education as topics to be discussed.

Likely to be of particular interest to DP managers is the topic of motivating the traditional computer technical person who by nature, LaBelle said, needs more challenges.

"The DP person is inquisitive and constantly wants to learn. A company must provide this type of person with those things that will keep him on board," he said.

"I have found that if you provide the necessary vehicles, employees will stay with you. Because of the law of supply and demand in the DP market, there are many opportunities available and companies must be aware of this," he added.

Difficult Task

Motivating the DPer to move into management is also a difficult task, according to LaBelle. He said that DPers have a tough time becoming managers because traditional management approaches to situations are not in agreement with the way they think.

"Their nature is to do things themselves and not to delegate responsibility. For these reasons they often find it hard to understand management's way of thinking," he said. DP people have to be motivated in a special way, according to LaBelle, who said an explanation of his methods will represent a large part of his talk.

Also on LaBelle's human resources panel will be Harry B. Bernhard of IBM, discussing personnel and productivity, and J. David Benenati of the Bendix Corp., talking on communications "glitches" in management information systems .

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About Paul Noll

Paul had worked in COBOL about 15 years—and he knew it inside out—when he started to experiment with structured programming. So he was able to develop complete, practical methods for applying structured theory to COBOL. He then trained dozens of programmers in his job at Pacific Telephone to use his methods. Soon, project managers were asking for his trainees—not experienced programmers—when they needed a job done right and on time.

Paul now works with companies across the nation as a consultant. His services range from helping to set or review shop standards to selling upper management on structured programming. He's got all the facts and figures and the names of the some of the largest companies in the country (as well as some of the smallest) who have implemented his methods with great results.

Paul also gives on-site seminars in structured techniques and advanced COBOL. His many years in DP and his remarkable sense of humor give his seminars sparkle and add to the enjoyment of learning. Most important, the people who take his seminars are eager to put what they've learned to work.

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Microdata to Go 32-Bit With Debut of Sequel Family

(Continued from Page 1)

32-bit architecture enables the original Sequel family member to support four times more main memory, two times more disk capacity and nearly three times more terminals than the most powerful Reality model.

ALL reportedly shortens application development projects from months to weeks by automatically translating user-generated systems design into finished code. The "software generator," is also said to be entirely self-documenting.

Wordmate, meanwhile, consists of a licensed software package and a dual-purpose terminal that allows users to do both data and word processing on the same system. The software and terminal, both of which can be retrofitted to Microdata's existing Reality systems line, are also credited with conserving users' disk space by allowing word processing to be done from the same files as DP.

As its name suggests, the first of the Sequel family members was designed to provide an upgrade path for users of Microdata's smaller Reality configurations, which the company reportedly will continue to build upon and support. Sequel uses the same peripherals as the Reality line and can run all the Microdata customer bases' existing application software without modifications.

The supermini can also support up to 2M bytes of main memory, 1G byte of disk storage and 127 concurrent users, the source added.

By contrast, the largest Reality system can accommodate only 512K bytes of main memory, 500M bytes of disk space and 48 terminals.

Unlike its Reality sister systems, Sequel uses a bit-slice architecture that allows address registers to operate in parallel to produce two concurrent 16-bit data streams. The system's architecture also provides for:

- A dedicated I/O processor separate from the CPU, which is built around a proprietary Microdata computer chip.
- Sixteen direct-memory access channels that transfer up to 6.7M byte/sec.
- A special-purpose processor for local and remote diagnostics.
- An integrated arithmetic unit that executes a typical microinstruction in 150 nsec.

A minimum Sequel configuration, consisting of a 1M-byte CPU, 256M bytes of disk storage, four terminals, a 300 line/min printer and a magnetic tape unit, costs $149,500.

For a $22,700 one-time licensing fee, the system can be enhanced with an ALL package, which uses a series of design screens to prompt users in outlining their programs' design specifications.

Wordmate, meanwhile, costs $2,000 for a one-time licensing fee, $2,700 for each data/word processing terminal and $4,000 for a letter-quality printer.

Wordmate, ALL and the entry-level Sequel system are available from Microdata at 17481 Red Hill Ave., Irvine, Calif. 92713.

Info to Focus on Office

NEW YORK — Office automation will be a major topic of conversation at the Info 81 conference opening at the New York Coliseum next week.

The conference keynoter will be Donald J. Massaro, president of Office Products Division and executive vice-president of Xerox Corp. in Dallas. In his speech on "The Challenge of the Office of the '80s," Massaro will pinpoint some of the key requirements in achieving increased office productivity at all levels. According to the Xerox official, the key is a progressive system approach for the various changing functions of information management.

The sessions will address the changing office environment at various levels of user expertise. Seventeen sessions will be included on the fundamentals of word processing covering text editing, support systems, image transmission, copiers, microimaging, photocomposition, dictation, integration of DP and WP, planning, the impact on organizations and individuals and training.

The nine sessions in the advanced portion of the conference encompass how to reach the "office of the future" through techniques like viewdata and videotext systems, satellite offices, organizational changes, local networking, electronic mail and selecting vendors. Info 81 is produced by Clapp & Poliak, 245 Park Ave., New York, N.Y. 10167.

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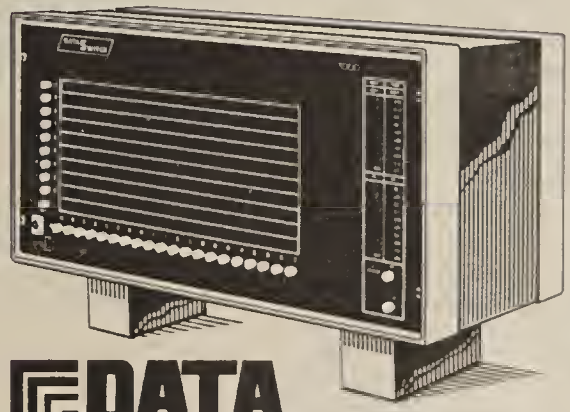

DATA SWITCH

Xerox Ethernet Called 'Travesty' by NAC Exec

By Phil Hirsch
CW Washington Bureau

SAN DIEGO — Xerox Corp.'s Ethernet is "a travesty of a local area network," according to Morton Fortgang, director of plans and programs at Network Analysis Corp. (NAC).

"By using baseband instead of broadband technology, Xerox has limited the geographic range of its network, forced the user to contend with additional electromagnetic noise and made it prohibitively expensive for him to employ non-Xerox terminal equipment," Fortgang said at the recent annual meeting of the Tele-Communications Association here.

He also said that because the 50 - ohm cable specified for Ethernet is incompatible with the coaxial cable used by the CATV industry, Ethernet users will be denied an opportunity to cut costs.

As he put it: "CATV has become a very hot item. That means more equipment is being manufactured and the costs are obviously going to come down." But since the CATV industry uses 75-ohm cable, neither that cable nor the related modems, amplifiers and interface hardware will be suitable for Ethernet.

Cost Cutting Ability

Fortgang, whose company is one of the nation's leading telecommunications network consultants, said that local area networks will be built only if they reduce existing communications costs. Their ability to do so, he added, depends largely on the extent to which they integrate presently separated communications networks.

For as integration increases, more human and material resources are shared and more administrative overhead associated with separate networks is eliminated. The major sin of baseband networks such as Ethernet, according to Fortgang, is that their integration potential is extremely limited.

A baseband channel can be time-sliced to accommodate different data applications, he pointed out, but this scheme will not permit continuous transmission of voice and/or video along with the data. Nor will it permit analog and digital data transmissions to be carried over the same message path or allow use of different protocols. A broadband local area network can accommodate all of these variations, he added.

The future success of local area network technology also depends on how user-friendly the access routine is, Fortgang said. That parameter is controlled largely by software, and because software also controls the applications that can be supported by the network as well as the extent to which already-installed equipment can be used, a local area network vendor should be chosen on the basis of its software support capability.

Providing protocol conversion "is one of the biggest problems in network design and will undoubtedly remain a problem for some time . . . In my opinion, the software vendors will ultimately drive the local area network market," he said.

Capacity Irrelevant

Although telecommunications networks typically are selected at least partly on the basis of their transmission capacity, Fortgang indicated this really is not a relevant consideration in the case of local-area networks. Regardless of whether a baseband or broadband, single- or dual-cable system is chosen, it probably will have far more capacity than the user needs, he said.

In his Tele-Communications Association talk, Fortgang discussed in detail a computer simulation of a representative network containing 1,000 terminals, 25 word processing centers, 20 facsimile units, 10 minicomputers, five teleconferencing centers and a gateway to a long-haul network.

The major conclusions were that even a 3MHz baseband network could carry the communications traffic generated by these facilities with insignificant network delay.

Furthermore, the delay was not increased significantly when message traffic was quadrupled.

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With FCC Deregulation

Consultant: Bell Terminal Charges to Rise

By Phil Hirsch
CW Washington Bureau

SAN DIEGO — AT&T will increase its terminal equipment rates substantially as soon as the deregulation authorized by the Federal Communications Commission (FCC) late last year is implemented, according to Dr. Lee L. Selwyn, a widely known communications consultant.

Selwyn predicted at the recent Tele-Communications Association (TCA) meeting here that present charges for most terminals will increase "threefold or more" during the next five years.

Originally the FCC, in its Second Computer Inquiry Decision, told Bell it could begin marketing terminal equipment on a nontariffed, nonregulated basis next March 1.

Deadline Delay

But at a recent House of Representatives committee hearing, FCC Chairman Mark Fowler indicated this deadline would slip, although from what he said it is clear the commission wants the delay to be as short as possible.

In his presentation here, Selwyn said AT&T, after deregulation, would move toward establishment of a single nationwide price level for each of its terminal products — a level "at or above the highest rates now being charged." This will result, he added, in 100% rate increases for users in some states.

Efforts to fight Bell's price increases are stymied by the company's legal and economic power, Selwyn contended. The Bell system, he explained, "has even deeper pockets than the federal government" because Bell's legal costs are automatically added to its rate base and, thus, automatically paid by its customers.

Also, although competition exists in some telecommunications markets, it is totally unable to curb Bell's monopoly power, Selwyn said.

One indication of that monopoly power is AT&T's "migration pricing" stragegy, under which rates for older terminals are raised to a point where the user is persuaded to replace the equipment with a newer model. If there were adequate competition, the user would switch to a non-Bell supplier offering equivalent capability.

Another example of AT&T's market dominance, he said, is the "flexible pricing" tariffs approved by a number of state utilities commissions in recent years. These tariffs, once OK'd, would allow Bell to raise rates substantially — in some cases without any upper limit — without having to obtain the commission's approval. The regulators assume that competition will prevent excessive charges.

Selwyn, a communications economist, has participated on behalf of users in a number of these tariff proceedings. He told his TCA audience that in Ohio, Bell filed a flexible tariff that proposed raising rates 38% initially and up to 100% afterward. Four months after the tariff was OK'd by the state commission, Ohio Bell, "to no one's great surprise," according to Selwyn, announced a 100% increase. Overall, he reported, the flexible pricing tariff raised rates 175%.

Because of the government's decision to let AT&T market terminals on a deregulated basis, terminal charges will no longer be constrained by the rate of return limitations, which regulators impose on regulated utilities, Selwyn explained.

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Digital Voice Systems Prove Hot Topic at TCA

By Phil Hirsch
CW Washington Bureau

SAN DIEGO — Digital voice communications systems were a hot topic here at the recent annual meeting of the Tele-Communications Association (TCA).

Delphi Communications Corp. of Inglewood, Calif., an Exxon Corp. subsidiary, unveiled Voicebank, its voice store/forward system, and SP Communications, Inc. of Burlingame, Calif., simultaneously announced a service based on Delphi's technology.

Centigram Corp., based in Sunnyvale, Calif., which recently introduced a terminal capable of converting an analog voice signal into a 4.8K bit/sec digital bit stream, showed a 2.4K bit/sec version at TCA. Paradyne Corp., Largo, Fla., did likewise. Similar equipment, announced earlier, also was promoted at TCA by Codex Corp., Mansfield, Mass., and by Racal-Milgo Information Systems, Miami.

Dr. Charles Davis, Centigram's vice-president for research and development , expects his company's terminals, which now cost $10,000 to $15,000 apiece depending on the quantity ordered, to be half as expensive in three years.

NEC Chips

Today, he explained, the terminal needs 150 "rather expensive" integrated circuits, costing a total of around $2,000. NEC, a major Japanese supplier, has recently introduced a sophisticated signal processor chip that performs two million multiple/sec and includes a program memory that can store up to 2K-byte 24-bit words.

Davis expects that within a few years, four to 10 of the new chips will be able to replace the 150 his company is now using. The cost of the circuitry should then be one-half to one-fourth of what it is now.

Today, the main market for digital voice systems consists of international data communications users. Present equipment enables them to multiply up to four voice circuits onto a 9.6K bit/sec international leased circuit, explained Centigram Marketing Vice-President Leonard Magnuson.

The circuit costs about $10,000/month and eight Centigram voice terminals add approximately $96,000 to the investment. But since this configuration eliminates the need for three leased voice circuits, each costing $10,000/mo, he explained, the terminal investment can be recouped in less than four months.

Wideband Channels

Davis pointed out that wideband digital channels will accommodate a much greater number of digitized voice circuits. A 40K bit/sec channel, for example, can easily multiplex 10 2.4K bit/sec digital voice signals and provide sufficient separation among them to prevent interference. The savings generated by replacing 10 analog circuits with one digital channel, he added, should enable many of today's telecommunications users to pay for their digital terminals in a short time.

At least one digital voice application is already being offered at a mass market price. Delphi's new Voicebank system can be purchased for $1.8 million to $3.5 million, depending on the number of terminals to be served and the number of functions provided.

However, SP Communications' (SPC) new Automated Message Manager Service, announced at the TCA meeting here, will cost a user $25/mo for each station, plus 25 cents for storage of each 30-second message. There is also a one-time $20 sign-on charge. The system stores messages direct to a customer from any telephone in the world. It also allows a customer to input a stored message; SPC will then deliver it when and where the customer directs, redialing the called party if he fails to answer the first time.

According to an SPC spokesman, a user can have approximately 70 inbound messages stored by the Automated Message Manager Service for $80/mo.

Delphi Communications Corp. has been offering a basically similar service in San Francisco for the last four years. A second center opened recently in Los Angeles. "We expect to open two or three more next year," Vice-President Larry Lotito said.

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Four-Phased Approach

Ek Urges 'Crowbar' Method of Software Buying

By Lois Paul
CW Staff

CHICAGO — Ask probing questions when talking with vendors about their software packages. "Get that crowbar out and really get to the issues."

That was the advice from William T. Ek, a systems consultant with Arthur Andersen and Co. in a session at the recent Software Info here entitled "Buying Quality with Your Software Dollar."

In the four-phased approach to procuring software, which he defined as planning, designing, installation and production systems support, it is often the latter step that is overlooked, he said.

The users need to determine that the system will fit their needs in all areas before the vendor loads it, tests it and says goodbye, Ek said.

He pointed to the need for quality assurance programs, which only began to be developed two to three years ago and are beginning to mature.

"We like to think of software quality being in the eye of the user," Ek said, describing it as the interpretations and expectations of the users.

Users should look beyond traditional areas such as documentation, support, training and upgrades to often overlooked areas such as references, delivery, performance and support, Ek advised.

More Than Program

Quality is more than the program itself and its documentation, Ek said, describing it as the entire aura of the package from the user's expectations all the way to ongoing support and maintenance.

Users should determine how complete the testing of the software is after delivery, Ek said, noting that a good idea is to have the software exercise the features that will be implemented, those that go beyond initial installation tests supplied by the vendor.

It is important to determine what type of support is available, as well as where it is offered and in what form, he said.

Regarding quality assurance programs, vendors currently get "four stars" for having the necessary procedures in place, "three stars" for their commitment to the concept, only "two stars" for the completeness of their programs and a single star for the programs' lack of independence or objectivity, according to Ek.

He cited Software International Corp. as having a seven-person quality assurance team, which is higher than average and also gave good marks to Management Science America, Inc.; McCormack & Dodge Corp.; and IBM. He said the latter company is extremely aggressive about quality testing early in the development process because it is less expensive to correct problems if they are caught early.

In general, vendors are weak regarding a balanced emphasis on release and support, according to Ek, and do not have a good handle on multiple industry versions of their software.

Quality assurance programs often are too distribution-oriented, rather than hitting more of the development phases, Ek added. He also noted that error reporting systems range widely in capability among various vendors.

As a user is signing the contract, Ek recommended that he firm the delivery date and be fully aware that it is a standard version and not a prerelease of the software that he is receiving.

"Be sure you understand the maintenance agreement. It can provide a lot more service than you might think on an almost free basis," he said. Determine exactly what the acceptance terms are, Ek advised, and "bargain like heck and see what you can get."

DP Fair Set for Nov. 9

PHILADELPHIA — The first annual National Industrial Distributors Association/Southern Industrial Distributors Association (Nida/Sida) EDP Software Fair will be held Nov. 9-10 at Stouffer's Riverfront Towers in St. Louis.

A total of 27 working exhibits of DP systems are planned in conjunction with 16 miniseminars, all catering to the needs of industrial distributors. More information is available from Nida/Sida EDP Software Fair, 1900 Arch St., Philadelphia, Pa. 19103.

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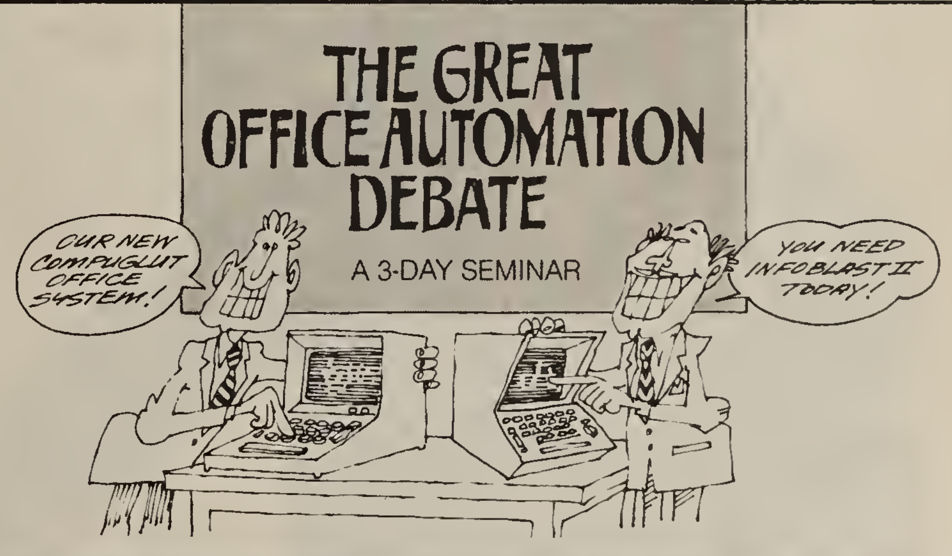
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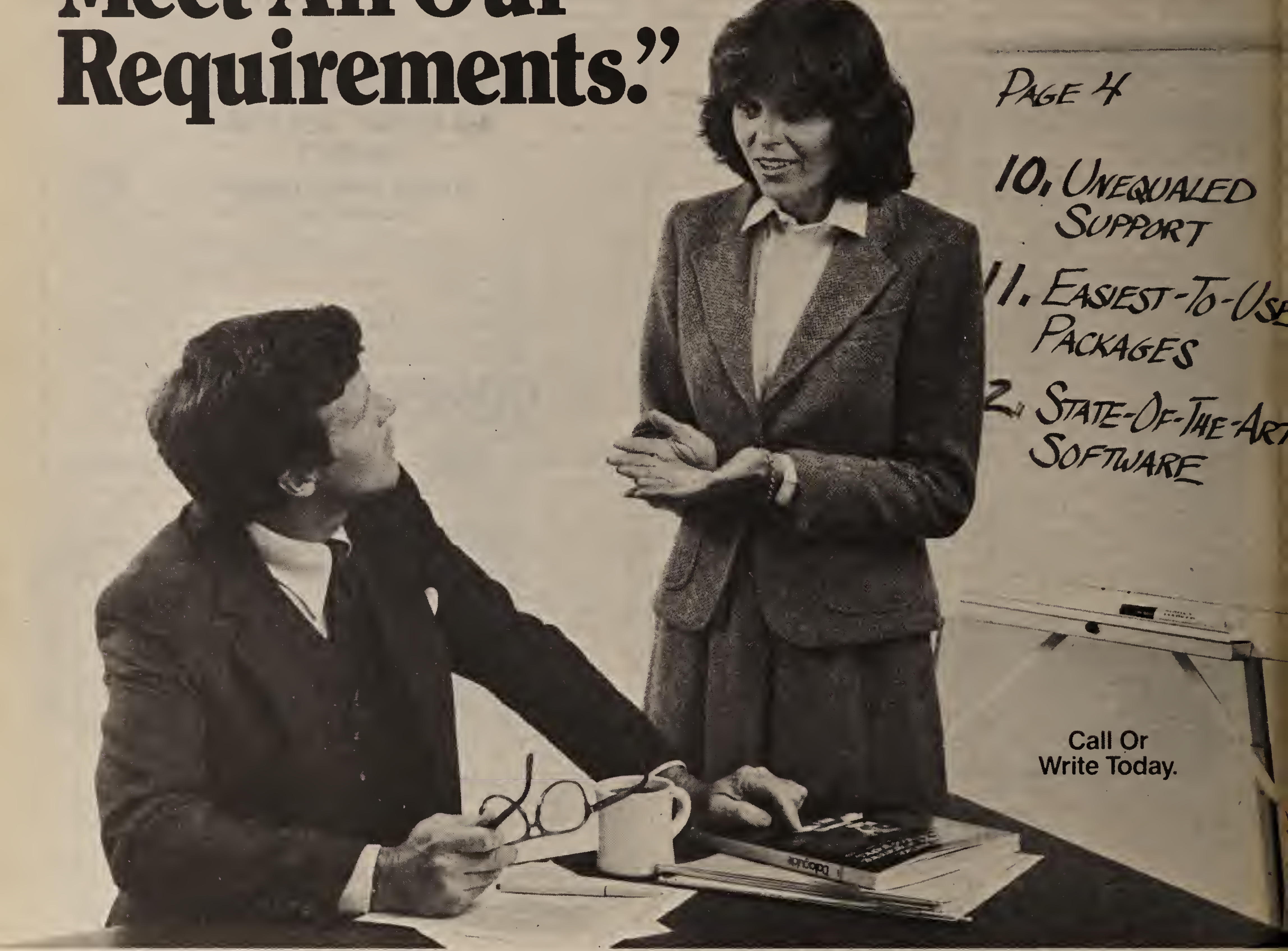

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Microdata 4000	239.7 Sec	3.4 Sec
Alpha Micro AM-100T	45.2 Sec	5.7 Sec
Data General CS/50	112.4 Sec	9.8 Sec
Altos ACS8000-10	473.1 Sec****	6.8 Sec****

* Programs could not be run properly due to a loss of characters in the order-entry processing.

** For programs run in Cobol; the respective times for Pascal are 68.1 sec and 3.9 sec.

*** The 8-terminal test could not be run, as a maximum of 5 terminals can be connected. With 4 terminals, times were 47.6 sec for the CPU test, and 2.3 sec for the order entry test.

**** Tested with only two order entry terminals due to 4-port limit.

Costing much less than the other systems it is running against in this series of benchmark tests, the Altos Computer Systems, Inc.'s ACS8000-10 could not handle as many terminals at once, but showed acceptable response time with two or four users.

The ACS8000-10 is the ninth in this series of 12 multiuser systems, most of which fall into the $25,000 to $50,000 price range. Although the ACS8000-10 costs less (under $13,000), it is often compared to other systems in the higher price range. Thus the Association of Computer Users (ACU) included it in this group of tests to see how it stacks up against the slightly bigger multiuser systems.

The ACS8000-10's order entry time (see Scorebox) was obtained with only two terminals, rather than eight as in the tests of other systems, and is therefore not directly comparable. In this simultaneous order entry/CPU-intensive test, the CPU-intensive task requires its own terminal. There is a limit of four terminal ports in the Altos System, so the order entry test was not run with four, six or eight terminals.

In a separate test where the CPU-intensive program was not running at the same time, the order entry problem was run with four terminals and response time was about the same.

When the program was run during the order entry test, the system's CPU-intensive times came out significantly slower. However, it would be possible to speed up the CPU-intensive program at the expense of terminal response by using the Oasis Systems, Inc.'s operating system's ability to control the time allocations for different tasks.

The actual system tested consisted of a Z80A processor, 208K bytes of main memory, a 10M-byte Winchester-type hard disk, a 1M-byte floppy disk and the operating system. Including a terminal and printer, the total price of the tested units was $12,340.

RTE Micro

As with other computers in this series of multiuser tests, the Altos system was tested by the business research division of the University of Colorado using a special testing rig called a remote terminal emulator (RTE). The RTE is a small microcomputer with eight ports, which, when hooked to the computer undergoing testing, simulates the activities of operators at up to eight terminals. In this way, human factors can be taken out of the response time testing.

At first, we wondered what the small 8-bit Z80A-based system would do when compared against the more powerful 16-bit machines that we have tested to date. Despite the slower CPU test time, we found that when the ACS8000-10 was used with the Oasis operating system, many capabilities and features found on larger (and more expensive) machines were available.

The Oasis operating system by Phase One Systems, Inc. uses a line-by-line structure as opposed to a menu-driven approach. To aid the user, a HELP command is provided. When entered alone, the HELP command gives information on nearly all the Oasis commands available. When HELP is invoked in conjunction with a particular system command, information on that command is provided. Oasis also provides a user accounting system, whereby user access can be allowed (or restricted) to the various system commands, through the log-on procedure's user ID and password.

This is the 38th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

The Oasis Basic is an enhanced version of the standard Dartmouth Basic and supports four types of file structures, including sequential, direct, indexed sequential and keyed. Other features such as matrix manipulation and command interfacing capability with the operating system are also provided.

The Oasis Exec processor allows the user to set up and execute command or procedure files. These files can contain multiple Oasis commands, which can be passed as parameters when executed. IF statements, arithmetic operations and CRT screen control make these Exec files powerful and flexible.

However, it appears that the Oasis Basic mathematical routines (especially the exponentiation and square root functions) are less than optimal, given the times obtained for the CPU-intensive tests.

The Oasis system includes diagnostic routines, a text editing system, a documentation processing system and an intercomputer communications system. A two-pass symbolic assembler, a program link routine and an on-line interactive program debugger are also supplied.

Besides Basic, a variety of other languages, including Fortran, APL, PL/I and several versions of Cobol and Pascal, are also available for the ACS8000-10.

The ACS8000-10 series of computers uses a single circuit board that contains the Z80A processor, memory and the I/O controllers. This single board configuration precludes any memory or controller expansions and limits the maximum number of terminals to four.

The Z80A microprocessor is widely used in the microcomputer industry and due to its popularity, a large variety of Z80 software is currently available. Altos does not develop applications software, but does publish a 45-page software guide that lists operating systems, languages and applications software programs that can be used on the ACS8000-10.

Although the ACS8000-10 performs well as a multiuser microcomputer, we feel that the limitations imposed by the single-board configuration would impose a severe restriction on many users. Altos has announced a new system based on the 16-bit 8086 processor, which will expand the Altos line to include a larger, more powerful multiuser system.

The ACS8000-10 comes with a 1M-byte single-sided, double-density floppy disk drive. The system is also equipped with a Winchester-type 10M-byte hard disk drive. A magnetic tape cartridge unit may be purchased for backup purposes.

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.

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Set Goals, Not Objectives

Analyst: IS Planning Key for Future MIS Execs

By Phil Hirsch
CW Washington Bureau

CHICAGO — It is a hybrid discipline where the experts usually rely on five years of experience at most. But strategic information systems (IS) planning will be increasingly important to management information systems (MIS) executives of the future.

That was the message from Robert V. Head during a session on strategic MIS planning at the Software Info conference here last week.

This type of systems planning is long-range in nature and initially concerned with goals rather than objectives, explained Head, who recently left the Brookings Institution to set up what he calls a "company for the analysis and planning of information technology [Capit]."

A goal is an "abiding statement of purpose" that is "nonquantitative in nature," he said. It is a succinct summary and can often be stated in a single sentence. "Develop the telecommunications capability to link managers in branch offices to the central organization" is an example of a goal statement.

Setting objectives takes place only after the goals have been formulated, according to Head. A manager who defines 12 goals in a systems organization could wind up with anywhere from 50 to 100 objectives, he estimated.

That will serve as a communication device not only between the MIS director and top management, but also between that same director and his professional staff. This document must be "entirely devoid of technical jargon" and geared toward a nontechnical audience, he warned.

Besides formulating and documenting goals and objectives, the IS planning process includes reviewing these items with top management and tracking progress made toward their achievement. Most systems plans fail if the latter two steps are skipped or ignored, Head noted.

Benefits that may be derived from strategic IS planning include enhanced communication throughout the systems organization, increased organizational commitment and improved project selection and control over department resources, he said.

The establishment of constraints tied to the process is another benefit since it "gets rid of a tendency on the part of the technical staff to work on projects that are interesting but don't [necessarily] support corporate goals," he pointed out.

While these benefits are undeniably attractive, attaining them is not easy, Head warned as he handed audience members a list containing no fewer than 19 deterrents to effective MIS strategic planning.

Including such factors as reluctance to change, inability to cope with company politics and user apathy and lack of confidence, this list also mentioned the shortage of experienced MIS planners. "Most people just haven't been at it very long," he noted. "They have five years of experience at most."

MIS Guidelines

He then provided 10 guidelines to help MIS executives who are on the threshold of experimenting with strategic IS planning:

1. Make provisions in the systems plan for taking small steps rapidly. "Don't have a plan with goals extending so far into the future that there is no way of tracking it," Head noted.
2. Develop alternative plans when significant contradictory trends are discerned in business objectives or technology.
3. Interface the systems plan with the corporate plan, modifying both appropriately.
4. Document the systems plan in a format intelligible to top management and arrange for a personal presentation.
5. Establish a formal mechanism for review and reiteration of the systems plan.
6. Develop a system for tabulating and forecasting utilization of installed DP equipment.
7. Fix the organizational responsibility for systems planning. This may involve modifying the job description of the person who is charged with the planning activity, Head noted.
8. Rotate the assignment of technical personnel to the planning staff in order to avoid an "ivory tower aura."
9. Budget for research and development.
10. Set up a comparative systems intelligence activity.

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Decision Analysis Promises Success, CUE Told

By Bruce Hoard
CW Staff

SEATTLE — "Decision Analysis" is a decision-making process that promises success because it thoroughly addresses the key components of decision rendering, according to Gary Merkel of Sundstrand Corp.

Merkel said good decisions come from hard work and clear thinking. Also, "the quality of a decision is directly proportional to the quality of the input to the decision." He made his remarks at the Comten Users Exchange (CUE) meeting here recently.

Most people want to be involved in the decision-making process, he claimed. "They may not want to make the decision, they may not want to be responsible for the decision, but they sure want to be involved in making it," he declared.

Decision analysis provides a systematic approach to decisions. One of the areas addressed by the process is environments that are unfavorable for decision making.

Multiple Alternatives

Those environments include the availability of multiple alternatives. In the case of a data communications manager, that could translate into a choice between such items as value-added networks, modems and more.

Another difficult environment is created when someone must make a decision and does not have final authority over its outcome, Merkel noted. Such a situation can be worsened when it involves technical questions that must ultimately be decided by management.

One of the pitfalls commonly associated with the decision-making process include the tendency to do things on impulse, he said. The end result may be the generation and support of only one alternative.

He warned against such a limited choice: "If you make the wrong choice, it's tough to live with it sometimes."

Viewing positives to the exclusions of negatives is a very large mistake, he emphasized, adding it is an easy and common mistake.

Assumptions can also be misleading, Merkel said, noting "I think we sometimes get mislead by salespeople in differentiating between facts and assumptions."

Good decisions should be based on all the available information and be well documented so they can be defended against attack by thorough justification.

The first and most critical step toward a decision is the establishment of objectives. After that, a search for alternatives should be conducted. "They may come in the form of a request for information or price quotes," he added. Alternatives should then be compared to determine their relative value.

In order to weed out elements that have value but are not vital, Merkel suggested all objectives should be measurable. The way to make them measurable is to assign them weights on a scale of one to 10. Through a multiplication formula, the most valid criteria can then be made known, he claimed.

However, even the most valid criteria are not necessarily going to be applied, he observed. What they represent are the makings of a "tentative choice."

That choice must then be evaluated to determine what its adverse effects are: What are the adverse consequences and how serious is each consequence? What finally results is a "balanced" decision, he said.

Merkel listed several benefits of the process. Management is likely to identify with a decision reached through the same methods it would employ, thus breaking down one of the most formidable barriers.

The process also makes it easier for other people outside the immediate decision-makers to support the decision. "If people see the effort you made, they'll generally back it," he said.

Such a decision is flexible enough to deal with disagreement, he added. If somebody does not like an element of it, that part can be changed without scrapping the entire plan. Only a little reassessment is called for.

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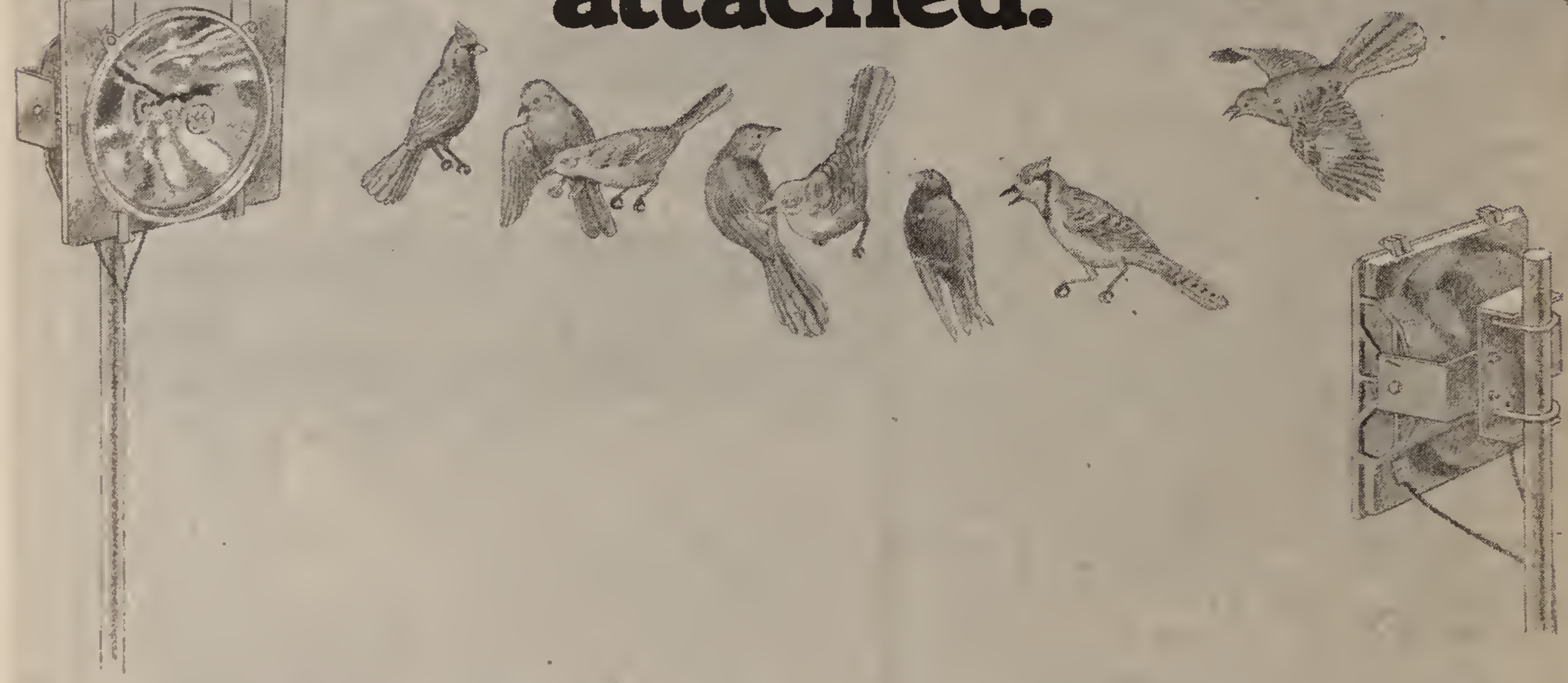

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Part 8. . .

Alan M. Turing: From Theory To Reality

By Marguerite Zientara
CW Writer/Analyst

When the history of computing enters the modern era, we begin to see the integration of ancient, disparate threads of theory and experimentation to produce a workable, practical computing machine.

In the 19th Century, Lady Lovelace, "the first programmer," had suggested that, in automatic computing, a large calculation might contain many repetitions of the same sequence of instructions [CW, July 27].

A century later, in 1936, the British mathematician and logician Alan M. Turing extended and updated her ideas with the publication of one of the single most important papers in computer science, "On Computable Numbers With an Application to the Entscheidungsproblem."

Besides expanding on Lovelace's work, Turing theorized on a machine that also would have delighted the 17th Century philosopher Gottfried Leibniz [CW, July 13], who foresaw "a general method in which all truths of the reason would be reduced to a kind of calculation."

In his 1936 paper, Turing specified a completely abstract, theoretical computer that could do any calculation a human could do. The "Universal Turing Machine" featured many aspects that were later incorporated into all general computing machines.

Turing himself later took the opportunity to bring his ideas to life through his seminal work on what are generally regarded as the world's first working electronic digital computers, developed by Britain during World War II.

By all accounts, Alan Mathison Turing was an eccentric genius who generally maintained a cool, detached exterior among acquaintances, but who was truly a warm, caring person to those who knew him well.

Born in London on June 23, 1912 of upper-middle-class, well-educated parents, Alan showed his brilliance early. Around his third birthday, his mother wrote to his father, who was frequently absent on business, that Alan was "a very clever child, I should say, with a wonderful memory for new words. Alan generally speaks correctly and well. He has rather a delightful phrase, 'for so many morrows,' which we think means 'for a long time,' and is used with reference to past or future."

At the age of eight, his interest in science just blooming, Alan wrote a succinct treatise, "About a Microscope," which began and ended with "First you must see that the lite is rite."

By the next year, however, Alan's scientific mind was much more sophisticated. He is said to have startled his mother, out of the blue, with the question, "Mother, what makes the oxygen fit so tightly into the hydrogen to produce water?"

In prep school, Alan looked upon sports as a waste of time, although years later he would become a first-class marathon runner. He noted, in retrospect, that it was during his early school years that he learned to run fast — he was always racing to get away from the ball.

At the end of the school year, his classmates joked about his interest in sports:

"Turing's fond of the football field
For geometric problems the touch lines yield."

For Christmas, 1924, Alan received a chemistry set and immediately began experimenting in the cellar of his home. Much of his effort went toward trying to extract iodine from seaweed from the local beaches.

At 12, he wrote his mother: "I always seem to want to make things from the thing that is commonest in nature and with the least waste of energy."

Obviously precocious, Alan soon received formal recognition of his gifts in the form of the Kirby Mathematics Prize — after his first term at the prestigious Sherborne School — followed by the Plumptre Prize for mathematics.

His mathematics instructor wrote that Alan was "a mathematician, I think." Not yet 15, Alan had evolved the calculus term, "$\tan^{-1}x$," without any knowledge of calculus.

In 1930 and 1931 Alan won the newly created Christopher Morcom Prize for Natural Science, named after his best friend at Sherborne who

(Continued on Page 26)

Courtesy Digital Computer Museum

Alan M. Turing

In his 1936 paper, Turing specified a completely abstract, theoretical computer that could do any calculation a human could do. The "Universal Turing Machine" featured many aspects that were later incorporated into all general computing machines.

Turing later brought his ideas to life through his seminal work on what are generally regarded as the world's first working electronic digital computers, developed by Britain during World War II.

(Continued from Page 25)

had died in 1930. The prizes meant a great deal to Alan because of that friendship and in a letter to his mother he demonstrated the depth of feeling of which he was capable:

"I feel that I shall meet Morcom again, somewhere and that there will be some work for us to do together, as I believed there was for us to do here. Now that I am left to do it alone, I must not let him down, but put as much energy into it, if not as much interest, as if he were still here. If I succeed I shall be more fit to enjoy his company than I am now . . . It never seems to have occurred to me to make other friends besides Morcom, he made everyone seem so ordinary."

Besides the Morcom Prize, Alan won the Westcott House Goodman scholarship and the King Edward VI Gold Medal for mathematics. Upon his graduation from Sherborne, his head master described Alan as "a gifted and distinguished boy. . . Mathematicians and Scientists one is apt to regard as being soulless creatures; but Alan is not, he is warm-hearted and has a savoring humour. We shall miss him, for he was a character and won respect."

And a character he was. At Cambridge, Turing did things in most unorthodox ways. To determine the correct time when setting his watch, Alan would not simply ask a friend the hour, but rather was known to observe a specific star, as seen from a definite place, and mentally calculate the correct time.

His complex ways of doing potentially simple things was a good indication of Turing's mental sophistication. Conclusive proof of his brilliance came in 1936, when at the age of 24 he wrote his paper, "On Computable Numbers."

In a letter to his mother explaining that the paper would be published that fall in the *Proceedings* of the London Mathematical Society, he explained that it was significantly different from one on the same subject just published by Alonzo Church, who taught at Princeton University.

It was Church's presence at Princeton that convinced Turing, "I have decided quite definitely about going there" for graduate studies. Once at Princeton, Turing wrote home, "The mathematics department here comes fully up to expectations. There is a great number of the most distinguished mathematicians here, [John] Von Neuman, Weyl, Courant, Hardy, Einstein, Lefschetz, as well as hosts of smaller fry."

Turing's paper, now considered one of the most important contributions to computing theory, presented a crucial theorem in mathematical logic in terms of an idealized computing machine.

Turing, however, was not the only mathematician to evolve a theoretical, abstract computing device. As often occurs with scientific breakthroughs, a second person simultaneously and independently arrived at the same conclusions.

Emil L. Post, a professor at City College of New York, published a paper in *The Journal of Symbolic Logic*, also in the fall of 1936, on "Finite Combinatory Processes — Formulation 1."

In that paper, Post suggested a computation scheme by which a "worker" can solve all problems in symbolic logic by performing only machine-like "primitive acts." It is remarkable that the instructions given to the "worker" in Post's paper and to a Universal Turing Machine were identical.

Turing, however, was in the right place at the right time. It is likely that his association with Princeton's Von Neumann — another brilliant pioneer in computing — ensured the prominence of his contributions. Von Neumann apparently was not aware of Post's work.

Von Neumann, often credited with developing the stored program concept, took a deep interest in the ideas of Turing and later extended them in his own work.

The Turing-Post theoretical digital computer was described as having an arbitrarily long tape running through the machine. The tape was divided into squares, on each of which was a one or a zero.

The machine would scan the tape one square at a time and sometimes alter what was on the tape by changing a zero to a one or a one to a zero.

(Continued on Page 28)

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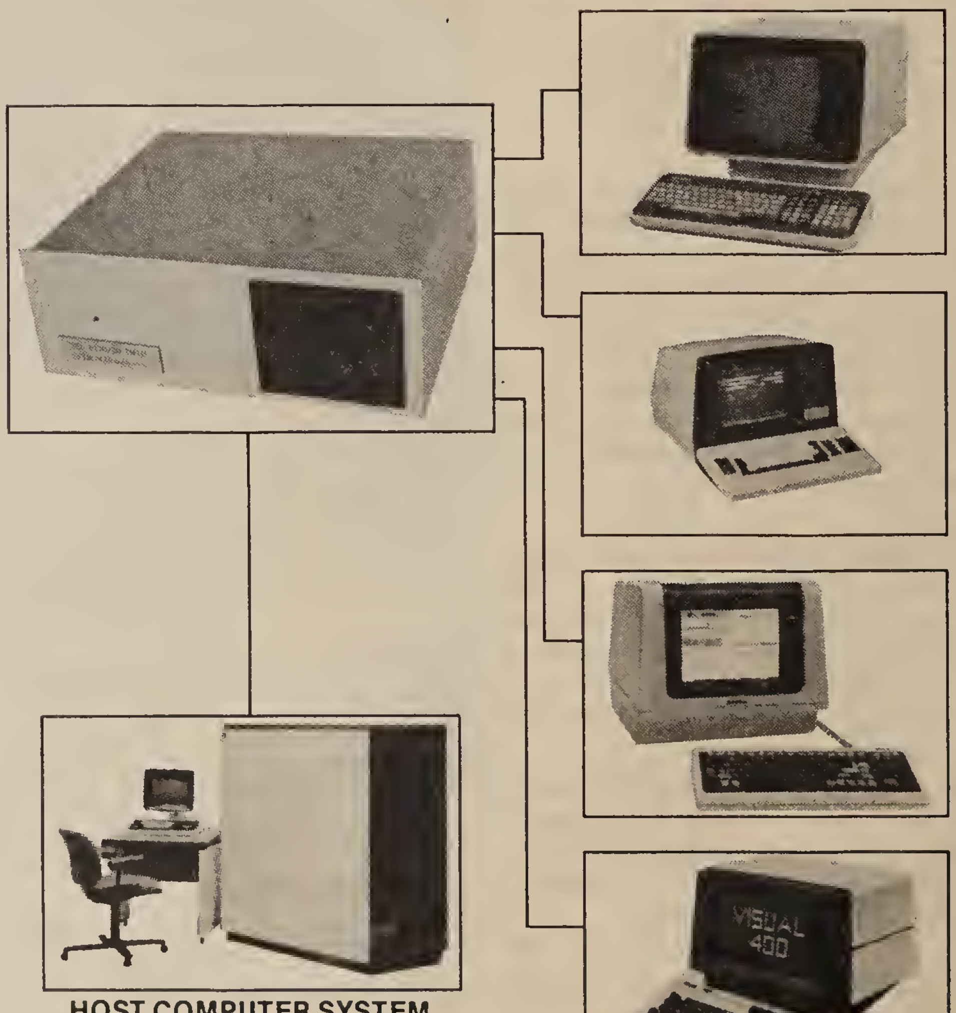

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The 8770/20 IMIU offers flexibility and power to users of all types of Honeywell computer systems that use VIP protocol. The 8770 provides a VIP-7700 compatible interface for up to 32 serial RS232 devices such as CRTs, printers, Teletypes, etc. All devices share one synchronous line to the host, yet each device may have a different "personality" provided by driver programs in the IMIU.

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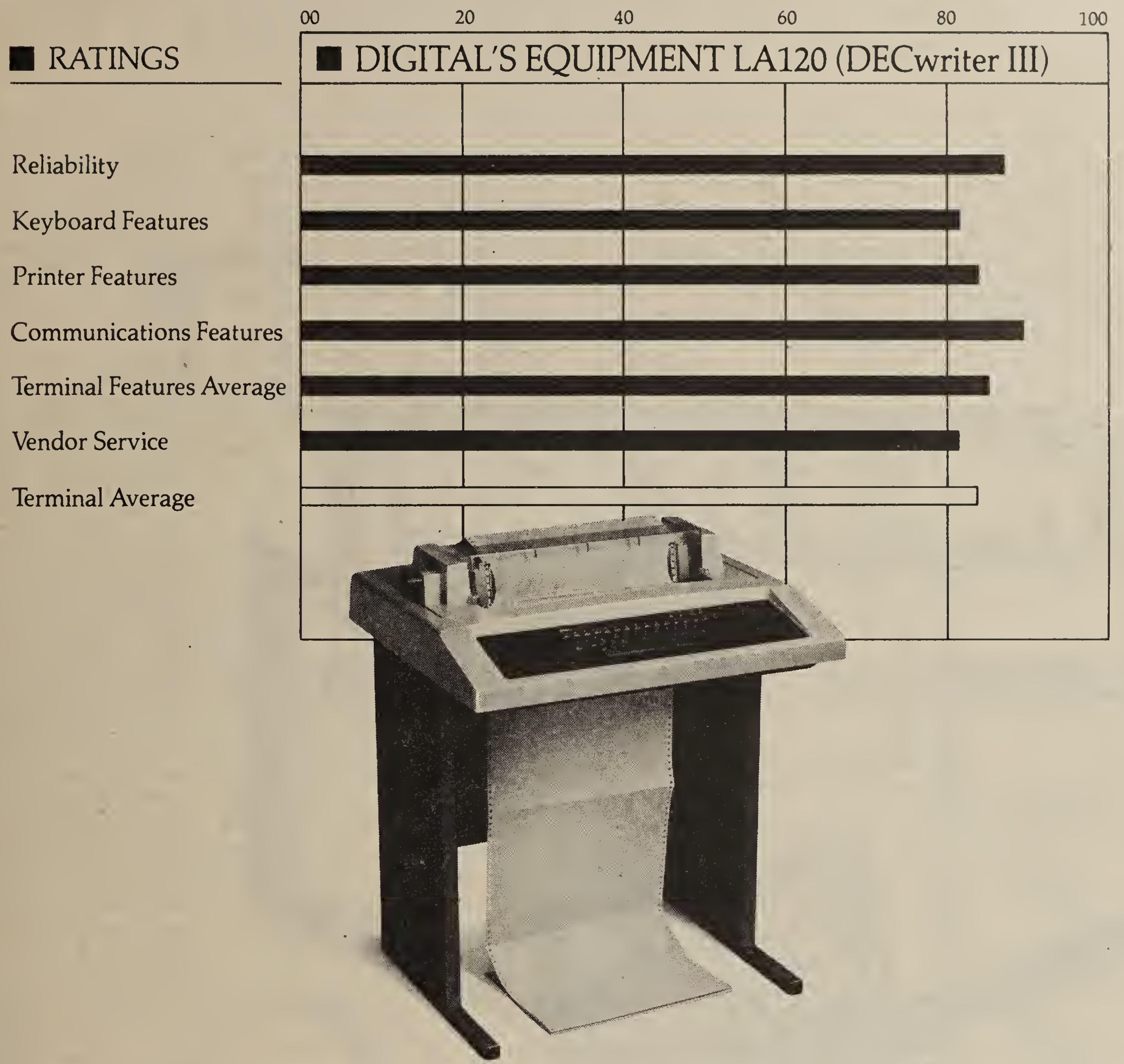

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(Continued from Page 26)

Consisting of a collection of stored instructions, the machine could scan a square and choose its next instruction. It could also move the tape forward or backward by one square.

Such machines could perform a variety of calculations and Turing was able to prove several theorems about them. First, he proved that in the mathematical sense there must exist "universal" Turing Machines.

Universal Turing Machines are Turing Machines that can be programmed to do any computation or logical operation that any other Turing Machine can do. In other words, a Universal Turing Machine can be programmed to imitate any other Turing Machine.

Secondly, Turing showed that, even when given a "fixed and definite process" for solving a set of problems, some of those problems still cannot be solved. This was contrary to the prevailing views of the well-known mathematician David Hilbert.

An example of Turing's theory is shown by the so-called "Halting Problem," which addresses the question of whether a given Turing Machine with a given tape will ever stop computing or whether it will continue indefinitely.

Turing showed that there must exist at least one Turing Machine for which this question is, in principle, undecidable. One cannot devise a program to determine whether or not the machine will stop computing, according to Turing.

Turing's conclusion was a variation on a theorem proved in 1931 by Professor Kurt Godel of the Institute for Advanced Study. Godel's theorem showed that in a logical system as rich as arithmetic there must be at least one proposition whose truth or falsity is undecidable.

While some have regarded Turing's findings as proof that human intelligence is superior to machine intelligence, Turing in the mid-1940s replied to those points in his essay, "Can a Machine Think?"

"Whenever one of these machines is asked the appropriate critical question and gives a definite answer, we know that this answer must be wrong, and this gives us a certain feeling of superiority. Is this feeling illusory? It is no doubt quite genuine, but I do not think too much importance should be attached to it. We too often give wrong answers to questions ourselves to be justified in being very pleased at such evidence of fallibility on the part of the machines. Further, our superiority can only be felt on such occasion in relation to the one machine over which we have scored our petty triumph. There would be no question of triumphing simultaneously over all machines. In short then, there might be men cleverer than any given machine, but, then again, there might be other machines cleverer again, and so on."

After receiving his doctorate from Princeton in May 1938 for his thesis, "System of Logic Based on Ordinals," Turing was offered a post as Von Neumann's assistant at the Institute for Advanced Studies. Turing instead accepted a fellowship at King's College, Cambridge, in his beloved England. He was then 26.

Turing was a major force in the early British effort toward digital computing, which was made all the more urgent by the pressing needs of World War II. By early 1940, Hitler had a firm grip on Europe and Britain lived under the cloud of possible invasion.

The British government recruited a team of the best mathematicians and electronics experts known and housed them in a serene-looking country house in Hertfordshire known as Bletchley Park. The scientists, among them Turing, were ordered to develop machines for cryptanalysis in an effort to keep a jump

(Continued on Page 32)

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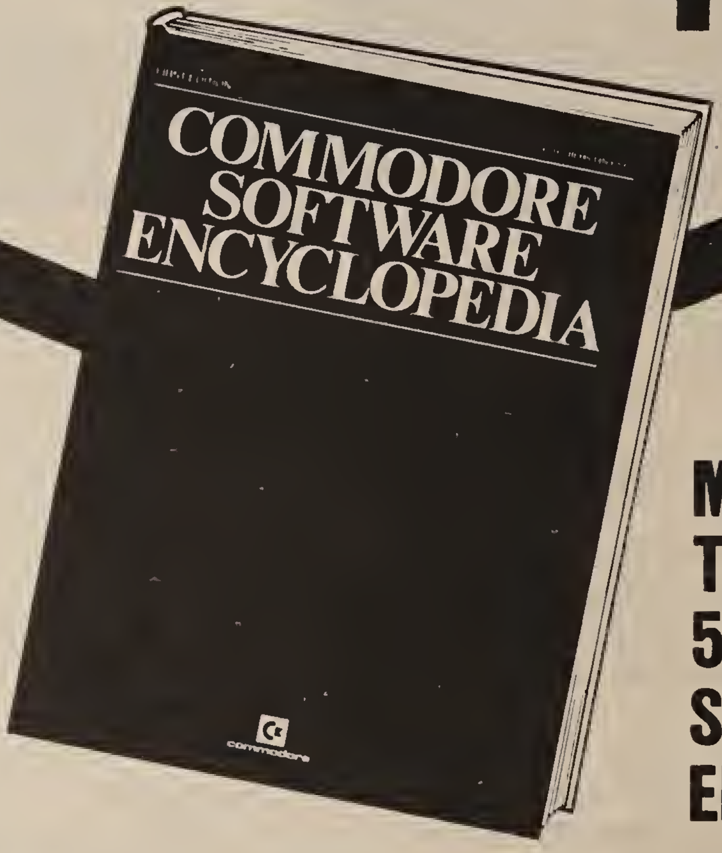

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(Continued from Page 28)

on Germany's military moves.

The Polish secret service had already captured the German's newest code machine, Enigma, and shipped it to England. It was at Bletchley Park that Enigma's secrets were revealed through the use of what are now considered the first working electronic computers.

Turing was involved in the design of that series, which began with several electromagnetic machines using telephone-type relays of the kind used in Howard Aiken's Mark I computer [CW, Sept. 21].

The electromagnetic machines were humorously nicknamed Heath Robinson (after the 1930s cartoonist reminiscent of Rube Goldberg), Peter Robinson, the Robinson and Cleaver (both named after London stores) and the Super Robinson.

The machines were truly effective and impressive since they could scan characters on paper tape through a photoelectric reader at the rate of 2,000 per second. Adequate today, that rate was virtually unheard of at the time.

From the Robinson series the team evolved a series called Colossus, which employed vacuum tubes instead of the relatively slow relays. Two thousand tubes did the computing and the paper tape input rate was pushed up to 5,000 char./sec, an even more outrageous speed.

The first Colossus was followed quickly by nine others before the war ended. While the Colossus series comprised the world's first electronic digital computers, and their capabilities far exceeded those of the contemporary Harvard Mark I in the U.S., they were special-purpose machines, dedicated solely to code cracking and not easily modifiable to any other purpose.

For that reason, they could not be considered a fulfillment of Babbage's dream of an Analytical Engine, while Aiken's Mark I was distinctly that.

Nevertheless, many people believe Colossus won the war for the Allies. The Germans reportedly had such faith in their Enigma machine that they simply used it throughout the war, mistakenly believing their telecommunications messages were inviolate.

Turing, in fact, was made an officer of the British Empire at the end of the war for his contributions toward victory.

With the war over, Turing was, as always, in great demand. Cambridge University offered him a lectureship, but he was more interested in testing out his 1936 theory and trying to build his own computer.

He presented a proposal to the government and joined the staff of the National Physical Laboratory in Teddington, England, becoming a permanent member of the Scientific Civil Service in October 1945.

At Teddington, John R. Womersley was head of the Mathematical Division. He had just returned from the Moore School of Electrical Engineering that the University of Pennsylvania, where work on the Electronic Numerical Integrator and Calculator (Eniac) was nearing completion.

Womersley brought the knowledge he had gained in the U.S., as well as Harry D. Huskey — who had written the engineering manual for Eniac — back to England with him to work on developing another computer.

As the Senior Principal Scientific Officer for the project, Turing reportedly "threw himself into the work with enthusiasm, thoroughly enjoying the alternation of abstract questions of design with practical engineering."

By November 1946, plans were nearing completion for construction of the Automatic Calculating Engine (ACE) Pilot (so-called to distinguish it from a larger ACE completed eight years later).

Demonstrated publicly in 1950, after Turing had already left Teddington, the ACE Pilot had storage capac-

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Designed for reliability, the ACE Pilot contained only 1,000 vacuum tubes. To store program instructions, the machine used the "two-address method," in which each instruction also contained the position in the store (its "address") where the next instruction had been placed. Therefore the program was not in sequence, but might be dotted randomly all over the store.

While delay-line storage was advantageous because of the small number of electronic components needed, it was bulky, sensitive to changes in temperature and to noise or vibration.

In spite of those disadvantages, the ACE Pilot was considered for some time to be the most powerful computer in the world. The London *Times* noted on Nov. 30, 1950:

"The speed at which this new engine works . . . could perhaps be grasped from the fact that it could provide the correct answer in one minute to a problem that would occupy a mathematician for a month.

"In a quarter of an hour it can produce a calculation that by hand (if it were possible) would fill half a million sheets of foolscap paper."

ACE was used for five years and eventually placed on exhibit in the London Science Museum.

In 1949 Turing had accepted a position of assistant director of the Manchester Automatic Digital Machine (Madm), said to have been the first stored-program computer ever built.

The wife of Turing's close friend, Professor of Pure Mathematics at Victoria University in Manchester, Maxwell H.A. Newman, said of that epoch: "I remember sitting in our garden at Bowdon about 1949 while Alan and my husband discussed the machine [Madm] and its futuristic activities.

"I couldn't take part in the discussion and it was one of many that had passed over my head, but suddenly my ear picked up a remark which sent a shiver down my back. Alan said reflectively, 'I suppose when it gets to that stage we shan't know how it does it.' "

Turing's theories on the relationship of the computer to the brain influenced countless scientists studying "cybernetics," the term coined by MIT professor Norbert Wiener [CW, Aug. 10] to mean "control and communication in the animal and the machine."

In 1951 and 1952, Turing took part in a series of radio debates on computers and their ability to think. One amusing retaliation to his theories came from Prof. Geoffrey Jefferson, who commented, "It would be fun someday, Turing, to listen to a discussion, say on the Fourth Programme, between two machines on why human beings think what they think."

"Why human beings think what they think," indeed. At the peak of his career and in the prime of life Alan Turing was found dead in bed, on June 8, 1954, at the age of 42. His death was caused by poisoning from potassium cyanide, ruled at the inquest to have been self-administered.

Sara Turing, who later wrote a book about her son's life, did not accept the verdict of suicide, as many of his friends also refused to do. For whatever reason he died, Turing's life will not soon be forgotten.

His mother established the Alan Turing Prize for Science to be awarded annually at the Sherborne School, where a new science building was named the Alan Turing Laboratories.

In addition, since 1966, the Association for Computing Machinery (ACM) has annually given its highest award, The Turing Award, for technical contributions to the computing community.

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EDITORIAL

Challenge for Managers

What's a management information systems manager to do when faced with implementing an office automation system today that must fit tomorrow's unknown needs?

Office automation is being touted from every rooftop, presenting a bewildering array of concepts and technologies to managers who are frequently unfamiliar with either user requirements, office technology or, worst of all, both.

Most users are only in the beginning stages of implementation, but the office automation market is surging ahead. Users are barraged with announcements of new and competing products. Vendors are already reducing prices and opening up the market to a wider circle of users.

Additionally, personal computers are proliferating in the business world. IBM's entry into the personal computer market signifies that the mainframe giant sees small business computers making a substantial impact on users.

So where does that leave the MIS manager charged with automating the organization?

Managers need to sit up and pay attention to what's happening in the field, even if their own corporate automation plans are still embryonic. Users and implementors must take it upon themselves to become more knowledgeable in system selection.

Even more important than knowing what a system can do is knowing what an organization really needs. Buying a system, no matter how good, which does not answer user needs will only exacerbate existing problems. It is the job of the decision maker — your job — to recognize a quality system and then match it to your organization's particular needs.

A Call for Benchmarking

Does the computer industry care about benchmarking?

Judging from the response of most major computer manufacturers to the call for a two-day meeting next week with the Association of Computer Users (ACU), the answer is a qualified yes.

The meeting on Oct. 12-13 in Boulder, Colo., is intended to come up with a single or group of testing standards that could be used by all vendors to evaluate the performance of mainframe computer systems. At least 15 computer vendors will participate; IBM will not.

Benchmark testing is no easy feat. There are many factors to evaluate in determining how and what to test. Next week's meeting will be a first and much needed step in that direction.

The interest and cooperation of users and manufacturers alike is essential to performing fair and accurate tests. The results of those tests — and of the ACU meeting — can only be to everyone's advantage.

DATA PAST

Five Years Ago
Oct. 4, 1976

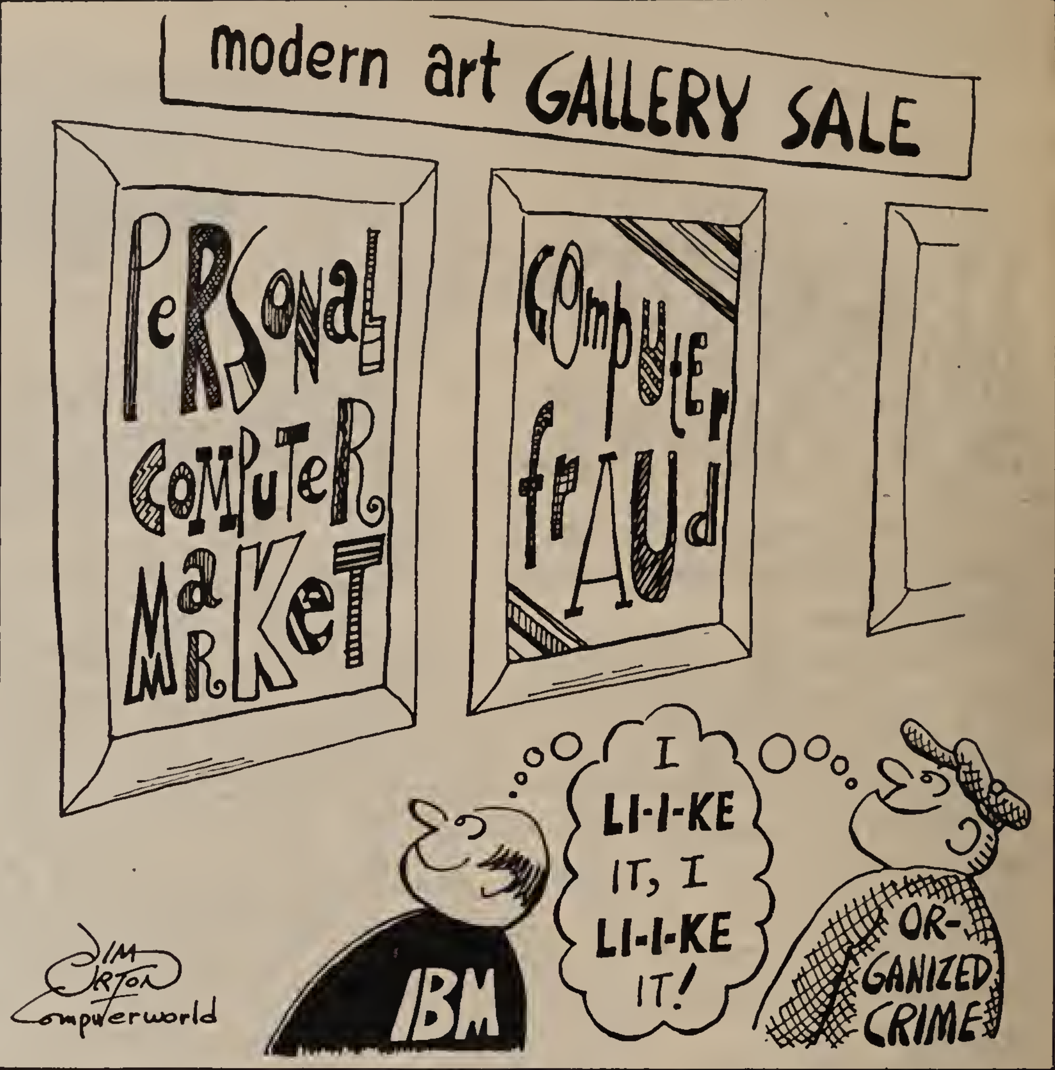
WASHINGTON, D.C. — The Consumer Communications Reform Act of 1976 "was an unprecedented grab for monopoly power over a critically important industry," Kenneth Cox, senior vice-president of MCI Communications Corp., said.

Cox set the tone for the second day of hearings on the proposed Reform Act conducted by the House Subcommittee on Communications.

Ten Years Ago
Sept. 29, 1971

After months of rumors, RCA's Sept. 17 announcement that it had decided to get out of the computer mainframe busines was not a complete surprise.

But the fact that RCA made the announcement before knowing how or when it would carry out the decision upset a lot of people — especially the RCA users. However, RCA pledged to meet "contractual commitments."



LETTERS

History Corrected?

I wish to take exception to portions of a recent article in the "History of Computing" series. In "Thomas J. Watson Sr.: The Businessman's Businessman" [CW, Sept. 21], it is indicated that the "first" electronic computer was developed at the University of Pennsylvania in 1946. This statement is incorrect and I shall attempt to present facts to prove the validity of my assertion. I believe that a publication as widely read as *Computerworld* should be as correct as possible, especially concerning the foundations of the computer.

The first electronic computer was developed by Dr. John V. Atanasoff of Iowa State University between 1937 and 1942 when he was called to do research for the Navy. In a February 1974 article in *Datamation*, Dr. Atanasoff discussed how "I generated within my mind the possibility of the regenerative memory" on that snowy evening in the winter of 1937-1938. During that same evening, he said, "I gained an initial concept of what is called logic today, that is a nonracheting approach to the interaction between two memory units . . ."

Before Dr. Atanasoff left Iowa State to work for the Navy, he shared his ideas with John Mauchly, then professor at Urinus College in Pennsylvania.

Atanasoff later invited Mauchly to come to Ames, where he was permitted to read, but not copy, Atanasoff's comprehensive manuscript describing the principles of the Atanasoff-Berry Computer.

He also had an opportunity to examine the machine itself. The report of this visit greatly influenced the U.S. court ruling that invalidated the Eniac patent secured by Mauchly and J. Presper Eckert. The federal district court ruling stated that the Eniac patent was derived from Atanasoff's work. In the court's words: "Eckert and Mauchly did not themselves first invent the automatic electronic digital computer, but instead derived the subject matter from one Dr. John Vincent Atanasoff."

It is important that Dr. Atanasoff receive the credit he deserves and that history be corrected to show where electronic digital computers were first developed.

S.D. Hanft
Data Processing Manager
Sturm, Ruger & Co., Inc.
Newport, N.H.

Thanks to Two-Year DP Ed

Two-year colleges are a greatly overlooked and underutilized store of potential to help ease the severe programmer shortage, as John DaPonte's excellent commentary pointed out "Don't Overlook DP Ed in Two-Year Schools" [CW, Sept. 14].

Four-year schools are becoming more prohibitively expensive each year. Who can afford the four years and countless thousands of dollars it takes to get a liberal arts education today?

Apart from the high cost, the four-year colleges adopt an antipragmatic attitude (ivory tower syndrome), that is, treating job control language as something too difficult for anyone to be exposed to but lab assistants. Trade schools also call for a sizable investment of time and money and, in turn, leave graduates more knowledgeable in computer internals than in dealing with fractious users of corporate politics.

All I can say is that I gained more on-the-job information from the many computer courses I took in the Norwalk St. Technical College Evening Division taught by DaPonte.

Marianne G.C. Seggerman
Technical Staff
Software Design Associates, Inc.
Norwalk, Conn.

SOFTLINE /Werner L. Frank

Is Ada the Programming Language for the '80s?

As we noted in the last column, Ada, the newly proposed programming language and system, has been the subject of much controversy [CW, Sept. 21]. On the critical side, in an interview for last year's spring issue of *ICP Interface Administration and Accounting,* Capt. Grace Hopper responded to a question on Ada's prospects as follows: "It's too all-purpose. Ada is a programming language designed for programming language designers. They forgot about the people who have to use it . . . As for Pascal and Ada, there will be an excitement about them for a while, and then it will die down. Then they'll go back to using Cobol and Fortran."

What, then, is Ada all about? One observer regards Ada as a three-ring circus. This metaphor prompts us to consider how busy and encompassing the project really is, consisting of a language/compiler, a common programming environment and a validation capability.

The Ada language represents a coalescing of all the good attributes of Pascal, Algol and PL/I, including more recent advances, as well as a solution to past weaknesses. From this point of view, perhaps Ada represents the best amalgamation of current academic findings, the ongoing European viewpoint and the avant garde American influence. The language features modularity and multitasking and highlights functionality to support systems programming.

Since Ada addresses the most challenging of large-scale software development, attention must be given to the structure of that software. Modularity is, therefore, called for at an unprecedented level to support the interaction of the software constructors and to facilitate the maintenance process.

Notion of 'Package'

Ada modularity hinges on the notion of the "package," a broad concept as well as the most notable feature of the language. The package is comprised of two components, each an independent file. The first file is the specification or declaration portion, while the second is the execution or operational code. Since each component can be compiled separately, there derives a high-level separation of data, parameters and procedure declarations and very late binding.

In order to better control the construction and execution process, the specification file is comprised of a visible and a hidden portion. The hidden portion is private and facilitates another Ada feature, "hiding."

Hiding is not necessarily intended only to provide protection or to afford a security function. Rather, it is present to enforce distinction between logical and physical interfaces and to facilitate decoupling of programs. Thus, hiding is a key concept in achieving the ability to separately compile elements of code.

Another key Ada feature supporting modularity is the compilation data base, or Ada program library. The Ada compiler will maintain a data base reflecting pertinent information for the compilations that have already taken place. Thus, dependencies between compiled units will be managed by the compiler itself. Furthermore, management reports can be generated out of this data base if names, procedures, parameters and interdependencies need to be checked.

The multitasking capacity of Ada is facilitated by the language features that allow for task concurrency and task scheduling based on priorities and interrupts. Sequencing of such related and interacting tasks is dictated by the "rendezvous" function. Tasks can either declare an "entry" point awaiting results from other tasks or declare an "accept" indicating that they are ready to deal with an entry call. Working together, the "accept" and "entry" features cause the rendezvous.

Programming Support

The third key facility of the Ada language relates to its capacity to support systems programming. Here we require performance efficiency, execution reliability and the potential to interface with external languages and physical hardware environments. Ada addresses all of these needs.

Turning now to the Ada programming environment, we note that the objectives of life-cycle support, configuration control, portability and project control should all be supported at the source language level. The Ada Programming Support Environment (Apse) is a response to these requirements. Apse, together with the kernel Apse (called Kapse), provides the basic mechanism for achieving the implementation structure and portability. Kapse comprises the low level and minimal set of functions, which are typically machine-specific.

This layered approach was designed to allow "rehosting" Ada from one development machine to another, and "retargeting," which implies operating the application on a variety of object machines. Interestingly enough, and on a historical note, these objectives of Ada would finally bring about the portability dreams of the late '50s, when Share sponsored the ill-fated quest for the Universal Computer-Oriented Language (Uncol).

The validation principle for Ada comprises a quality control function as well as an authorization process. Thus, the principle assures adherence and enforces conformance to Ada standards. This activity is formalized through the Ada Computer Validation Capability (ACVC), which will promulgate the methodology and procedure via a likely Department of Defense (DOD)-established enforcement unit, the Ada Compiler Validation Organization.

Greatest Weakness?

But there is an enormous and fundamental paradox about Ada. The Ada Language System is proclaimed to be the answer to developing sophisticated real-time systems. Hence, the more complex the system, the

(Continued on Page 40)

READER COMMENTARY /Howard A. Karten

Are You in DP? — Only the Patch Will Tell

Not so many years ago, when you told someone you were "in DP," it was pretty easy to figure out what you did. A beard, and/or pencils in the breast pocket, and/or a slightly wild-eyed look signified "programmer." A three-piece suit, and/or a neat haircut, and/or a very slim attache case, meant "computer sales." A tired, hounded look about the eyes, a rumpled shirt, a stack of reading matter and a pile of resumes meant "DP manager."

All this has been changed by advances in computers. Now, it seems that every time you sit down in a public place to have a cup of coffee, two people at the next table are earnestly talking about computers. American society clearly has a pressing need for a quick, pithy way of identifying all the players in the DP game.

Shoulder Patches

The Army has historically attempted to solve this problem with special insignia or shoulder patches. I propose a similar system for data processing.

The patch might have two parts: a larger, base part designating specialty and a smaller attachment (detachable, of course) holding the company name or logo.

I think this idea has much to recommend it. First, it will help eliminate those awkward moments when you don't know whether the person in the next seat is a competitor or someone from your Kansas City office, a techy type or a business type. Second, it will assist the historic trend in DP in which computers create jobs, rather than eliminate them. Think of all the people who will be employed designing shoulder patches, manufacturing them, selling them and so on.

Here are some suggestions for designs. Readers are invited to submit others.

- DP Users (Nontechnical division): This shoulder patch depicts a pipeline containing a mixture of dollar signs and question marks. The pipeline originates at a picture of a computer; it terminates at an open window.
- Operations Managers: This patch depicts a mixture of maalox, aspirin, valium and alka seltzer, esthetically arranged on a clock face to symbolize fleeting time.
- Programmers: Several disorderly piles of dumps, surrounded by half-consumed cups of coffee and cigarette butts.
- Executive Recruiters: Two possibilities here. One is a butter churn, symbolizing turnover. The other is a scrutinizing device, such as a jeweller's loupe or microscope, to designate the fine examination to which all candidates are put. In either case, the symbol would be mounted on that quintessential tool of the trade, the telephone.
- Alternative Communications Vendors: A knife and fork, poised to slice up Ma Bell.
- DP Salesmen: Crossed martini glasses, rampant on a stylized copy of a contract.
- First-Time Users of Plug-Compatible Mainframes: Crossed fingers, with a resume discreetly showing in the background.
- Communications Managers: This insignia depicts — what else? — crossed wires.
- DPers Involved in Distributed Data Processing: This insignia consists of not one, but rather several smaller insignia, worn at various locations on the body and connected in some fashion. Adventurous souls may choose to connect the patches with fiber optics.
- Researchers: In many cases, researchers are clearly distinguishable by their combination of beard, sneakers, pipes and use of jargon that sometimes sounds roughly like English. Therefore, they don't really need patches. Nevertheless, for those who feel insecure without one, the appropriate patch would show a digital clock indicating 3 a.m. next to a computer terminal and a pair of pajamas.
- Government DP: As befits reality, the insignia for those involved in DP with or for the government depicts an IBM 650 still in working condition.
- Public Relations Personnel in DP: This shoulder patch has the same approximate shape and coloring as a mailgram. Printed on it, in small letters, is a list of highly abstruse (and perhaps inflated) specifications, complete with newly-invented acronyms.
- Consultants: No single shoulder patch could possibly do justice to the wide range of expertise of which most consultants are possessed. Clearly, the only appropriate identification would be a full set of the insignia listed above, complete with Velcro fasteners to permit rapid changes.

Karten is a free-lance computer journalist who owns some of the insignia mentioned above.

LETTERS

Misuse of Mips

I would like to make a few comments in regard to the misuse of Mips as a tool for comparison between CPUs.

In the same CPU, not all of the instructions execute the same time. Moreover, the same command's execution time may vary with different addressing modes. Due to this, comparisons are made on some (arbitrary) reference set of instructions. It is clear that with different applications, different reference sets must be used, which is rarely done in common comparisons tables.

In an asynchronous CPU, the order of execution of instructions influences their effective execution speed. Exactly the same set of instructions will execute faster (or slower) when arranged differently. Combined with cache memory, or even virtual storage, the resulting effect may be extreme.

All of this refers to compatible CPUs. When comparing noncompatible CPUs, the comparison becomes meaningless. Not only may a stronger instructions set more than compensate for slower execution, the architecture of the machine (number of registers, addressing modes — to name a few) may change the balance considerably. Users should be very careful when evaluating two CPUs. Machines that perform better on one reference set yield only insignificant improvement on practical application. When comparing them to noncompatible CPUs, they must be evaluated in light of the intended application. The least that can be done is a benchmark. An insight to the application and understanding of the machine's architecture may also be beneficial.

Motti Shimoni
Consultant
Riverdale, N.Y.

Cobol Controversy

In "Alternatives to Cobol" [*Computerworld Extra!* Sept. 1], Peter van der Linden misrepresented the Cobol language when presenting his case for Ada. I am referring to figure 2: Cobol NESTED-IF vs. Ada case statement. In his example, IF "CODE" was neither equal to 'a', 'b', 'c' or 'd'. His intention, I assume, was that a piece of logic called "PROCESS-UNKNOWN-CODE" be performed. The way it is coded would prevent "PROCESS-UNKNOWN-CODE" from ever being performed because of the absence of the period following the previous statement. But worse than this is the style of coding he is showing. In all fairness to Cobol, a more readable (and workable) solution would be the following:

```
process-code.
    IF codes = 'a'
      PERFORM process-a-code
    ELSE
    IF codes = 'b' OR 'c'
      PERFORM process-bc-code
    ELSE
    IF codes = 'd'
      PERFORM process-d-code
    ELSE
      perform process-unknown-code.
finished-code.
```

I can see why people could be down on Cobol IF statements, if they are used as depicted by van der Linden. Even though Cobol gets kicked around a lot, it is still a powerful language. The IF/ELSE construct is simply a binary decision maker. The result of any IF test is either yes or no. Cobol does a super job of processing this construct. It's up to the programmer to organize his decision/action table in his own mind and then to tell Cobol what he wants to do.

Regardless of how complex any given decision/action table might be, it is still based on binary decision making, like a tennis ladder if you will. You make one decision at a time, yes or no. If the programmer is careful to indent his IF/ELSE clauses with each level of decision making he will find that he can follow his decision and action flow quite readily. He will also find that GO TO branching is not even required and that Cobol will do a super job for him.

We don't throw away a good car just because the driver keeps grinding its gears when shifting. So it is with Cobol. We shouldn't be so eager to give up on it because of its misuse.

Anthony van Wolferen
Technical Representative
Boeing Computer Services Co.
Sacramento, Calif.

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HUMAN CONNECTION / Jack Stone

Company Concentrates on Quality Training

Back home in the good old U.S. for a few weeks before attacking the next round of overseas mini installations, I happened to be introduced to an organization which, though modest in size, employs a breathtakingly new approach in its business dealings: the company strives hard to provide its clients with quality data processing services, employing creative, resourceful techniques as a matter of course.

Having depended primarily on references for customers — a refreshing note — during its quarter century of operations, The Holman Corp. of Washington, D.C., is headed up by Jack Deaner, a young-timer nearing his third decade in the business.

Creative Staff

Then there's the staff: coming from a background of computer-based editorial and publication services, they are imbued with the resourcefulness, imagination and professionalism more typical of media people than DPers. And their spirit is particularly evident in the use of their very own in-house computer, a Wang Laboratories, Inc. OIS/140.

Six terminals are installed in a classroom for hands-on advanced word processing training — except that the term "advanced" is an understatement because the curriculum is as deep as it is broad.

For example, one course is devoted solely to basic "glossary" (Wang's WP information retrieval capability), another moves through intermediate glossary and still another covers "decision processing," a useful programming language that is part of the glossary capability.

When I asked Jack to relate the company philosophy on achieving quality training, he answered this way:

"I'm not sure our strategy is unique, but it works well for us. First, we limit our class size: six students maximum. Then we try to select instructors who have solid practical experience in education, as well as data processing. Testing at the end of each course is mandatory and we give Continuing Education Unit credits to students that pass and withhold them for failure, notifying the customer organization along the way.

And if former students have problems, they can use our 'hot line' for telephone access to our staff. Finally, we prepare our own instructional materials, which meet stringent standards."

Capitalize on Capabilities

What also impressed me was the extent to which Holman has capitalized on the WP capabilities of the computer system for traditional DP applications.

The company develops data processing software written in the word processing decision processing code and designed to operate in word processing mode. For example, the company develops automated systems packages for contracts preparation and tracking and then customizes them to meet specific requirements, including needs for contract solicitation, procurement analysis and correspondence control — all in the word processing environment.

Maybe I'm easily impressed, but Holman seems to be doing a lot of things right.

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Is Ada the Programming Language for the '80s

(Continued from Page 37)

more applicable Ada should be. Yet critics warn that the size of the language structure and features make it vulnerable to breakdown.

Thus, it appears that the very complexity of the system may be its greatest weakness, in that it diminishes the reliability for which the system was primarily created.

One reputable source, Prof. C.A.R. Hoare of Oxford University, was quoted in the June 15 issue of *Information Systems News* as stating, "Ada represents a far greater risk to our environment and to safety than unsafe cars, toxic pesticides or accidents of nuclear power stations" if the language system is used in programming a nuclear weapon system.

And so we have the Ada story. But before we leave the subject, we must inject our own, serious doubt about the prospects for wide acceptance of this language system, especially in the commercial marketplace.

There is a notorious resistance to programming language change as it relates to the broad body of computer professionals. Neither the individual practitioners nor their management have the desire and incentive to adopt change. Cobol, Fortran and RPG are hard to displace!

We close by citing two tongue-in-cheek observations that have been made about Ada. The first comes from the correspondence pages of the May 1981 *Communication of the ACM* in which an observer linked the name Ada to a Biblical character in Genesis of whom the writer believes that the poet Byron surely was aware.

The hope expressed in this letter was that since Ada, who was the daughter of Byron, had poetic connections, the language bearing that name "will encourage poetic programming, so that we may all enjoy reading each other's programs."

Contrasting View

This position contrasts with a view expressed in the May issue of the German language monthly *Computer Magazin*. A report on an Ada workshop was entitled, "Die Geburt des Grunen Elefanten," or "The Birth of the Green Elephant." The color green refers to the winning design of the Ada environment, selected in a four-way competition, and the elephant connotes a large "war machine," or overkill.

The article included a large picture of the elephant, showing the torso and all of the internal body parts. Each part of the elephant was assigned an Ada attribute. The author started out quite positively in his illustration by showing how the language is fed through the elephant's nose, gnashed with the teeth, computed in the brain and processed by the digestive system.

However, the results end up in the intestines and the object code, unfortunately, was shown as back-end droppings. This is not very encouraging with respect to the future of Ada.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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LETTERS

Clarification

In a recent article you referred to Alpha Omega, Inc. as an authorized Digital Equipment Corp. distributor "Report Prepared via WP Put Smile on Realtor's Face" [CW, Sept. 7].

Please let me clarify that Alpha Omega is not an authorized distributor for DEC.

Ashman Samuels
Marketing Specialist
Digital Equipment Corp.
Merrimack, N.H.

Where's the Proof?

I read with interest "C.E. Shannon Put It All Together" [CW, Aug. 10].

Near the end of the article is a statement that the four-color theorem has been solved. At the time I got my master's degee in mathematics it was still a conjecture and I would love to see the proof. Where could I find it?

Kay S. Batta
Indianapolis, Ind.

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READER COMMENTARY /Janet L. Mushrush

Promoting Your Best Technician to Manager

How many times have you heard words like: "I don't understand why the technical support area is so messed up. The guy in charge knows the system inside and out."

By definition, technicians are persons "experienced in the technicalities of a subject." They are, at the very least, specialists in thinking and doing.

By contrast, the common definition of management is "getting the job done through people." This would lead one to believe that the manager's thinking should be broader in scope. In addition, communicating that thought process, with a little bit of tact, is a major portion of the manager's job.

To promote from within effectively, the goal should be to make your best technician your best tactician. But along the way, you'll probably need to change some of that thinking at both levels.

Courses of Action

To accomplish this, many courses of action are available. For openers, let's discuss how the two jobs are similar.

- Both are problem solvers.
- Both deal with most levels of management on a day-to-day basis.
- Both know the value of systems knowledge.
- Both are required to meet deadlines and produce quality results.

This is where the similarities end.

The technician is concerned with doing things right. He is solution-oriented, tackles things from a limited scope and demands results from his efforts. He is probably a loyal person, although most likely loyal to his profession.

The manager is concerned with doing the right things. He has loyalty to the profession and (and this is a big and) to the corporation. Because he has as his responsibility a department of professionals, he must direct their energies to coincide with the grand scheme of corporate objectives. This requires an entirely different set of talents from those of his people. It is not necessary in his job for him to be able to sit down and program, although you'll probably find him there if you've promoted him from the ranks without proper guidance.

This is a key point when considering this action. Because they originally chose to be a programmer, they chose it because they like programming. They are not unlike nurses who have been promoted to head nurses in this respect.

Head Nurse Comparison

The head nurse must be concerned with personnel scheduling, pay increases and various other management duties. It is a rare nurse who can make the transition to management without difficulty because nurses like to be with their patients. That's the reason they chose nursing in the first place. This is the type of dedication to the profession, whatever the profession, that makes it doubly difficult to change the thought process and enable those people to get on with the job of managing.

With this background brought to light, let's turn to some step-by-step procedures to prepare you for this decision: promote from within or hire an experienced manager.

Step 1: Have the manager's job well defined and get specific. Without this, you'll have a difficult time selecting a potential manager from your ranks. How can you know who'll be good for the job if you don't know what the job is?

Step 2: Know your people. With all their good and bad points.

Step 3: Narrow down your prospects and make your selection. Use every bit (and byte) of information at your disposal. Interview your people to assist in this process. By now, you've chosen the most qualified people for the job. Now choose the one who has the most desire to have the job. Examine all the motivations. For a person to do a good job, they have to want the job.

Step 4: Train your choice. They're going to need the basics if they have spent the bulk of their career being a technician. Basics are defined as communication and interviewing techniques, confrontation and delegation skills, coaching and counseling concepts and numerous other management functions. (Don't forget Accounting 101. Everyone has budgets.)

Most of the large DP companies are addressing these very needs and offer fully developed, excellent courses to which you may send your new manager. A quick look at the types of course offerings you receive will tell you that everyone is recognizing the need for these skills.

A common mistake concerns the concept of time.

Because of work priorities and other reasons, most companies promote an employee and stick them right on the job with the idea that they'll acquire these new

(Continued on Page 46)

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CW-10

Can a Technician a Manager Make?

(Continued from Page 44)

skills through osmosis or that they'll send them to class when "things simmer down a bit." Don't make this mistake. They'll never be a 'right' time if it's not now. Allow the time to arm your new manager with the necessary tools to do his job. He needs to acquire a sense of what his management style is going to be and he needs to make that decision himself, not have it made for him by others and/or job pressures. Let him feel confident about starting out in his new role, a confidence that will result from proper training, and the transition will be easier for everyone involved.

Hard and Soft Benefits

You must be able to measure the results of your decision. You're going to have to see that your efforts are being rewarded, both tangibly and intangibly. That is to say, in some circles, hard and soft dollars.

- Goals and objectives realized on time and within budget.
- Ability to accept increased work load with decreased guidance (high productivity).
- Well-rounded management employee.
- Plaudits from above and heightened morale.
- Positive self-images of entire department personnel.
- Others see there is a goal toward which to work (career path).

Now let's look at some of the reasons not to promote from within.

"I have to find someone to do John's work now that he's been promoted." Sure, you now have to fill another position. But you took a good worker, a proven worker, expanded his knowledge base and rewarded him for a job well done. Isn't that part of the corporation's responsibility to its employees? Besides, you can look to graduating students to fill his spot, giving them a chance at the business world.

"It costs too much to send him to those schools." Sure, you spend money on him to train him for his new position. You probably would have spent equal amounts of time and money to train the new hire in the systems knowledge he would need.

Again, only you will be able to determine how long you're willing to wait to measure the results. With proper guidance and timely checkpoints on progress, a good rule of thumb is six months. By then you'll be able to see if there is improved departmental performance or, at the very least, a smooth transition from old to new. That in itself is no small accomplishment.

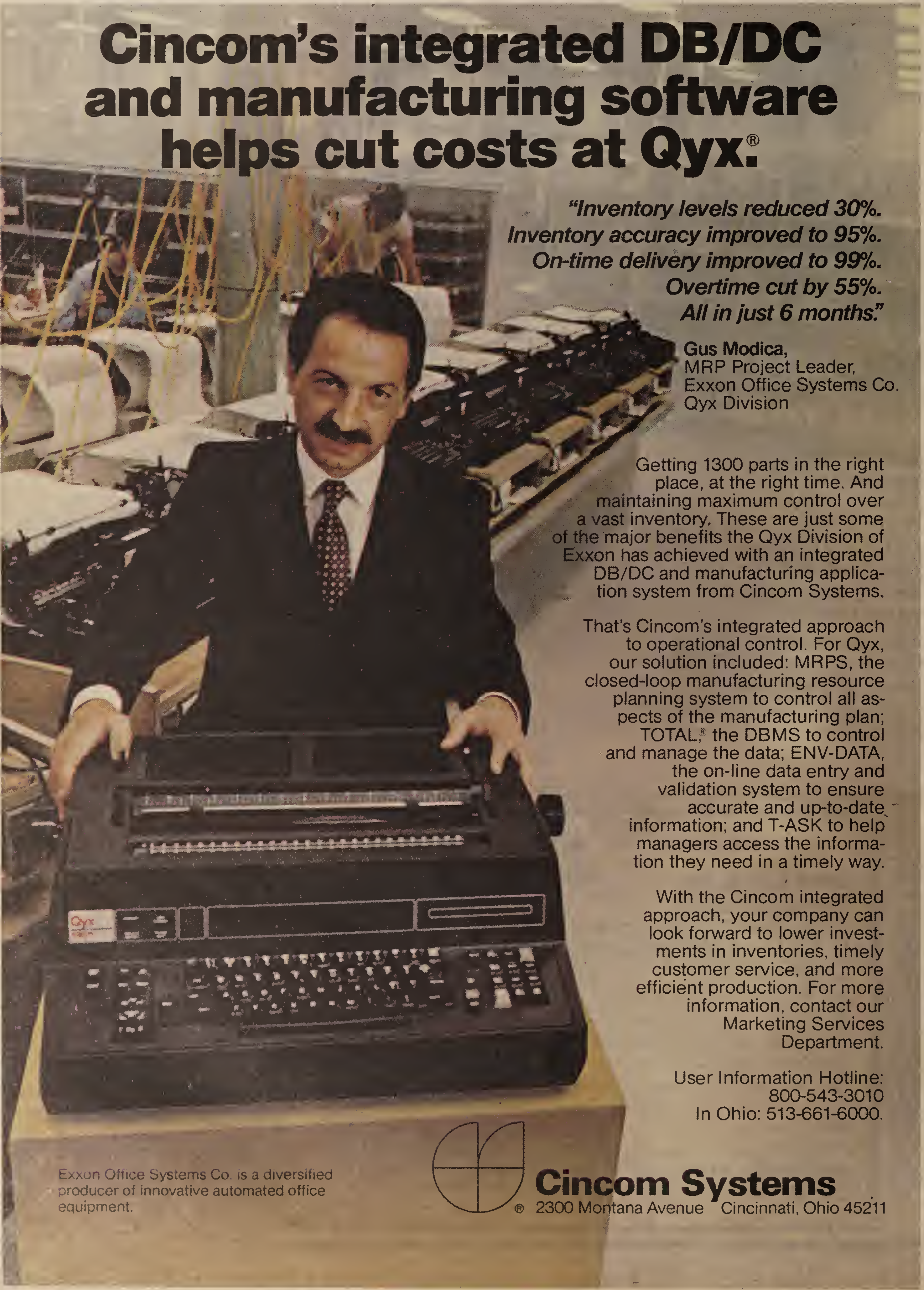
A year from your decision to promote from within?

Learning More Each Day

Your manager now has most of the management skills he needed and if he doesn't, he's learning more each day. You can pat yourself on the back now because you knew he had the "environment knowledge" he needed. He knew the formal and informal organization going in because he had been in it all along. This information, by the way, normally takes a substantial length of time for a manager from outside the company to ascertain. Couple this with your manager's knowledge of your particular system (he had that all along, too,) and you have one valuable employee on your team.

Can you afford to promote your best technician to manager? With proper training, you can't afford not to!

Mushrush is a technical training manager at Warner Amex Cable Communication, Inc.



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'Cbug' Aids Debugging In CICS Cobol

IRVINE, Calif. — Cbug, a program designed to aid the CICS command-level Cobol programmer in debugging and testing CICS application programs, was introduced here by Tower Systems, Inc.

Cbug runs on IBM and plug-compatible equipment under the DOS and OS operating systems. Its facilities reportedly include a display mode that will identify many of the major bugs on the first test run by displaying on the CICS terminal every Cobol paragraph executed and by trapping abends.

In interactive mode, Cbug is said to provide the programmer with elements that usually have to be determined through the use of a CICS transaction dump including program name, program load address, abend instruction displacement, last paragraph name executed and the instruction itself, the vendor said.

The vendor said the programmer also can display interactively program registers, working storage, transaction work area, program storage, Cobol base locator linkage cells address and CICS storage by entering the storage address.

A perpetual license for Cbug is available for $3,500, the vendor said from 19782 MacArthur Blvd., Irvine, Calif. 92714.

'DYL-Audit' Lets Auditor Set Formats

GRANADA HILLS, Calif. — Dylakor, Inc. has introduced a free-form version of DYL-Audit, a companion product to its DYL-280 report writer utility for IBM and plug-compatible mainframes.

DYL-Audit was designed for auditors and programmers and includes sampling techniques, frequency distribution, aging analysis, report writing and letter writing features, the vendor said.

It reportedly enables auditors to set up conditions and make decisions via IF THEN ELSE statements. Manuals are said to allow the auditor to "walk through" programs and show, step by step, how to perform auditing functions using English statements.

Any Format

The free-form version of Dyl-Audit enables the auditor to write reports in any format, the vendor said, and formats the reports based on the auditor's specification.

Up to 99 different types of letters, including any amount of variable data, may be generated per run, according to Dylakor. This will allow the auditor to determine the content of each letter based on conditions within the account, the vendor said.

(Continued on Page 49)

Packages for Minis To Mature in '80s, Consultant Predicts

By Lois Paul
CW Staff

CHICAGO — The minicomputer software field is highly disorganized, but it will mature and settle down during the 1980s.

This was the view David W. Staples, senior consultant for Sarig Business Systems, Inc., offered to those at a recent conference here.

In a presentation entitled "Future Trends in Package Utilization," Staples said there are three underlying factors affecting the future of mini software: users are increasingly unsophisticated; there is a shifting emphasis away from "how to develop" toward "how to buy"; and application software self-justifies the cost of the entire purchase, including hardware.

He stressed that the commitment and actual involvement of top management in the selection of a mini software package is the key to its successful implementation, particularly in a small- or medium-size company.

A major problem for users, according to Staples, is where to obtain mini software because the industry is so disorganized. "Users currently are left to their own devices," he said.

Staples predicted the establishment of retail centers, which could provide demonstration facilities that are impossible with mail order houses, and also could offer more experienced staff members to interface with customers.

More software developers will turn to hardware vendors or other specialized companies to market their products to eliminate the high cost involved in this end of the business, he said.

Retailers are anxious to take on software and even have to exert pressure, Staples said.

Rather than trying to be all things to all people, software companies will better target their products by finding a particular niche, he projected. The newer, smaller mini software companies will fill in the remaining gaps, Staples added, noting he does not see the same kind of dominance occurring in the mini software field that exists in the hardware area.

Among the distribution problems that must be addressed are security and financing. Regarding the latter, he said that most small to medium businesses simply do not have $40,000 to $50,000 lying around to invest in a package.

The "settling down" of mini software already has begun with small- and medium-size businesses beginning to realize that application software is a stand-alone product.

With the rising cost of personnel and the shortage of DP professionals, intelligent buying of software packages will serve to reduce DP budgets and produce quicker results that will benefit upper management, Staples said.

He suggested that software vendors themselves will step in as almost part of a company's management team to provide mini users with the organizational help to install a package successfully.

Cobol Scanner, Finance Tool Out

Capex Tools Aimed at IBM, HP Users

PHOENIX — Capex Corp. announced Optimizer:MRS, a productivity verification option designed to enable users of IBM equipment running under OS to scan load module libraries and report on the Cobol programs they contain.

The vendor also unveiled its Funds Management System, a financial modeling tool that runs on Hewlett-Packard Co. equipment and reportedly assists banks and bank holding companies with asset and liability management.

Optimizer:MRS reportedly produces both detail and summary reports and indicates the size and characteristics of each load module in a selected library.

It is said to read through the library members and identify and list the Cobol Control Sections and the load modules that contain them. Optimizer:MRS also provides information about compilation and size breakdowns of the Control sections, the vendor said, and indicates whether they have been processed by Optimizer III. It also was designed to check for and flag certain Optimizer III options.

The Funds Management System reportedly focuses on a bank's net interest margin and provides information about the components of margin and the margin dollars for any desired funding strategy or economic scenario.

It operates by week over a 26-week planning horizon and is supported by the Capex Autotab 300 financial planning language, which runs on the HP 300 minicomputer.

(Continued on Page 49)

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THE SCHEDULE:

MONDAY, NOVEMBER 2: 11:00 A.M. – "GOVERNMENT AND THE FUTURE OF TECHNOLOGY"
Speaker: Congressman Barry Goldwater, Jr. (Member of the Congressional Science & Technology Committee)

Monday Afternoon Sessions
1:30 – 4:00 P.M.

1 THE OEM PERSPECTIVE ON DATA BASE SOFTWARE
Organizer: Aaron Zornes
Software Ag of North America
Speakers:
1. Michael Gagle, Vice President, Research and Development, Micro Data Base Systems – "Small Computer Consideration for DBMS"
2. David Aune, Microcomputer Product Manager, Hewlett-Packard – "Minicomputer DBMS for Micros"
3. Aaron Zornes, Software AG of North America – "DBMS Means Price/Performance and Productivity to OEMs"
4. Harold Daniels, Director of Marketing, Tominy Inc. – "How the Product Life Cycle Benefits from Data Base Tools"

2 INDUSTRY BENEFITS OF THE ANSI X3T9/1226 RIGID DISK INTERFACE
Organizer: Richard Layer
3M–Data Recording Products Division
Panelists:
1. Richard Reiser, Dir. Engineering, Priam Corporation
2. Manfred Blum, Development Engineer, BASF Systems Corporation
3. Dick Dennison, 3M Laboratory Manager, 3M–Data Recording Products Division
4. Mike Shebanow, Associate Engineer, Advanced Micro Devices
5. Tom Thawley, Vice President, Interface Corporation
6. Bill Burr, National Bureau of Standards

3 CAD/CAM – TODAY'S APPLICATIONS
Organizer: Milt Morgan
Hy-TEK CAD-CAM

Tuesday, November 3, Morning
Sessions: 9:30 – Noon

4 UNDERSTANDING DEC
Organizer: Adolf "Sonny" Monosson
American Computer Group, Inc.

5 THE FORTH LANGUAGE
Organizer: Roy C. Martens
FORTH Interest Group
Speakers:
1. Martin Tracy, Micro Motion – "FORTH, An Overview"
2. Dr. Glen Haydon, Haydon Enterprises – "Data Base Management in FORTH"
3. Elizabeth Rather, FORTH, Inc. – "Business Applications in FORTH"

6 UNIX – LIKE SYSTEMS
Organizer: R.C. Nordrum
Point 4 Data Corporation

Tuesday Afternoon Sessions
1:30 – 4:00 P.M.

7 PASCAL – PORTABLE APPLICATIONS
Organizer: A. Winsor Brown, Jr.
Point 4 Data Corporation

8 LOCAL NETWORKS FOR MINI'S AND MICRO'S
Organizer: Dr. Dennis J. Frailey
Texas Instruments
Speakers:
1. Harry Saul, Nestar – "Cluster/One – An Integrated Microcomputer Network Environment"
2. Tom Rolander, Digital Research – "A Portable Local Network for Microcomputers"
3. Peter Kirschner and John Davidson, Ungermann-Bass – Title of Paper to be determined
4. Phil Belanger, Corvus Systems, Inc. – Title of Paper to be determined

9 TOOLS IN OEM/SYSTEMS INTEGRATOR APPLICATIONS
Organizer: Randy Knapp
Wespercorp

Wednesday, November 4, Morning
Sessions: 9:30 – Noon

10 THE REST OF THE ICEBERG: FUTURE DIRECTIONS IN MICROCOMPUTER SOFTWARE
Organizer: Edward J. Bride
Editor, Software News
Speakers:
1. Andy Johnson-Laird, President, Johnson-Laird, Inc.
2. Doug Broyles, President, Onyx Systems
3. Dr. Harry Saal, President, Nestar Systems
4. Seymour Rubinstein, President, MicroPro International

11 MICROCOMPUTERS AS ELEMENTS OF GRAPHIC SYSTEMS ARCHITECTURE
Organizer: Hiram French
Megatek Corporation
Speakers:
1. Michael Dolan, Megatek Corporation – "An 8086 Based Graphics System"
(Other speakers to be determined)

12 ADA – WHERE IT STANDS NOW
Organizer: William E. Carlson
Western Digital Corporation
Speakers:
1. Lt. Cdr. John F. Kramer, Ada Joint Program Office, U.S. DoD – "DoD Plans for Ada"
2. Dr. Larry Weissman, SofTech – "Ada Compiler Validation and the SofTech Ada Compiler"
3. Mr. Michael Ryer, Intermetrics – "Ada Implementation Activities at Intermetrics"
4. Dr. David A. Fisher, Western Digital Corporation – "Implementing Ada on a Microcomputer"

Wednesday Afternoon Sessions
1:30 – 4:00 P.M.

13 DATA COMMUNICATIONS FOR THE MINICOMPUTER USER
Organizer: Jim Jordon
Moxon Electronics

14 OFFSHORE TECHNOLOGIES – NEW OPPORTUNITIES FOR THE U.S. COMPUTER MARKET
Organizer: John Rehfeld
Toshiba America, Inc.

15 THE WAR OF THE WINCHESTERS
Organizer: Bud Bleininger
Tec Stor, Inc.

NOTES:

(A) Each Session will consist of an average of three speakers.

(B) All Sessions will be held at the Anaheim Convention Center.

(C) For Hotel Reservations, please contact:
Anaheim Marriott Hotel, 700 Convention Center Way, Anaheim, CA 92802. Telephone (714) 750-8000. For special rates, you should mention the MINI/MICRO COMPUTER CONFERENCE & EXPOSITION.

The South Hall of the Anaheim Convention Center will offer a wide array of industry products and services for your inspection and "hands on" demonstrations. Listed below are some of the companies who will be exhibiting (and the list grows daily!). Take in the Sessions, visit the Exposition, and you have an excellent opportunity to be informed of today's – and tomorrow's – Technology. (And – exhibiting companies have guest tickets valid for admission to BOTH the conference program and exposition. That could mean a potential savings of $100 to you!) Please contact your Vendor Representative.

Show Hours are:
Monday, November 2, Noon to 6:00 pm
Tuesday, November 3, 10:00 am to 5:00 pm
Wednesday, November 4, 10:00 am to 4:00 pm

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ISR Unveils Rims/MPG For VAX-11

CORAOPOLIS, Pa. — The Rims/MPG application generator is now available for Digital Equipment Corp.'s VAX-11 machines, according to its vendor, Information and Systems Research, Inc. (ISR).

ISR is committed to supporting DEC's RSX-11 and VAX-Cobol versions of its Cobol compiler, an ISR spokesman said.

"Both the RSX-11 emulation and native mode VAX-Cobol versions of Rims/MPG generate structured source code," according to Paul Sesto, a Cobol product development specialist.

This tends to make the generated program source code easy to modify, according to Sesto.

Rims/MPG for the VAX costs $17,500 on a single-CPU basis.

This price includes documentation, training and installation instructions, ISR said from Airport Office Park, Building One, 410 Rouser Road, Coraopolis, Pa. 15108.

'DYL-Audit' Announced

(Continued from Page 47)

DYL-Audit's aging analysis reportedly can be performed on past or future accounts and its sampling procedures vary from simple random and interval sampling to complex statistical sampling methods. The auditor may specify interval, logarithmic or alphanumeric frequency distributions, the vendor said, and histograms may be generated.

The price for the free-form version of DYL-Audit is $1,152/year on a three-year lease, the same price as the parameter-driven version of DYL-Audit, the vendor said from 17418 Chatsworth St., Granada Hills, Calif. 91344.

Capex Tools For IBM, HP

(Continued from Page 47)

Optimizer: MRS is priced at $2,500 as an option to Optimizer III. Until Nov. 15, it is available to existing Optimizer III users for $1,500. The Funds Management System costs $12,000 for current users of the Autotab 300. The Autotab financial planning software and the Funds Management System can be purchased for $40,000.

Capex Corp. is located at 4125 N. 14th St., Phoenix, Ariz. 85014.

TSI Adds Routing Facility to Docu/Master

MONTVALE, N.J. — TSI International, Inc. announced Release 1.0.3 of Docu/Master, which reportedly adds a document routing capability and enhances the performance of this on-line storage and retrieval package for IBM and plug-compatible mainframes running under DOS and OS operating systems.

The new routing facility enables Docu/Master users to send some or all of the documents retrieved from an on-line data base search to a file for subsequent off-line printing, the vendor said.

With the new send command, the document copies can be sent with special information such as the data base name, originating terminal and a user-specified title, TSI explained.

Print Command

Another feature of Release 1.0.3 is a print command that reportedly prints the documents that have been sent in addition to routing file management utilities.

The vendor claimed performance enhancements of the index file provide faster access during a data base search and reduce CPU usage during data base updates.

Pricing for Release 1.0.3 of Docu/Master starts at $22,500 for DOS versions and at $30,000 for OS versions, depending on options selected. It is available immediately, TSI International said from 50 Washington St., Norwalk, Conn. 06854.

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Vsamlist Fits IBM VS/OS, Said to Replace Listcat

BOSTON — Corodale, Inc. introduced Vsamlist for all IBM VS operating systems, which it claimed is a replacement for IBM's Listcat, which selectively lists the contents of Vsam master and user catalogs.

The reports produced by Vsamlist are said to provide a picture of all the Vsam files and volumes in an installation. Information reportedly is presented in a columnar format, with data for each file or volume summarized on a single print line, the vendor said.

Vsamlist provides a standard report that summarizes every file in selected catalogs, a file report that can be customized and a volume report. It is licensed at $895 as a one-time charge or $45 as a monthly rental.

Corodale is located at 211 Congress St., Boston, Mass. 02110.

TMS/I Allows Series/1 to Act As Net Station

COSTA MESA, Calif. — Software said to permit the IBM Series/1 computer to operate as a data collection station for a network of MSI Data Corp.'s remote portable data entry terminals has been developed by MSI.

The Terminal Management System (TMS/I) supports up to eight simultaneous communications lines in three basic operating modes — attended, unattended (terminals to computer) and autodial (computer to terminals).

The software requires an IBM Series/1 running under IBM's EDX operating system because EDX and RJE utilities are used for transmission to the host computer. Any host supported by these utilities may be used, the vendor said.

A master license for the software costs $8,000; the second through 10th licenses cost $4,000; the 11th and succeeding licenses cost $3,200. Maintenance after a six-month free period costs $1,200/year.

MSI is located at 340 Fischer Ave., Costa Mesa, Calif. 92626.

T/S Network Offers Costrak

ANN ARBOR, Mich. — Costrak, an on-line, interactive system said to help project managers meet increasing cost performance reporting requirements, is now available on the ADP Network Services, Inc.'s time-sharing network.

Costrak provides capabilities for cost/scheduling integration including the ability to compare actual costs with budgeted costs for work scheduled and performed, data base management capability for customized inquiry and reporting, graphics capabilities and technical support. ADP Network Services is at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

Simplan Available Through T/S Net

CHAPEL HILL, N.C. — Simplan Systems, Inc. has announced that Simplan, a corporate planning, analysis and control language, is available through the company's Simplan Time-Sharing Service.

Simplan facilitates development of financial planning, modeling, reporting and control procedures, the company said.

The Simplan Time-Sharing Service is available on a pay-as-you-go basis with information from Simplan Systems, Inc., 300 Eastowne Drive, Chapel Hill, N.C. 27514.

Loki's Language Fits DG Minis

WAYLAND, Mass. — Loki Enterprises, Inc. here introduced Magic/L, an interactive programming language for the Data General Corp. Nova and Eclipse lines of minicomputers.

Magic/L reportedly includes user-definable data types (record structures), type-checking in expressions and a variety of interactive programming aides. A built-in assembler allows routines such as interrupt handler to be written at machine level.

The initial license fee for Magic/L on Nova/Eclipse equipment under DOS or RDOS is $2,450 and $2,950 under AOS. Loki Enterprises can be reached through P.O. Box 123, Wayland, Mass. 01778.

Avatar Offers Library Aid

POOLESVILLE, Md. — Avatar Systems, Inc. has announced the availability of the Integrated Library System (ILS) said to perform basic library processing functions using an integrated master bibliographic file.

ILS is a minicomputer-based system that includes bibliographic control, catalog access, circulation, serials control and administration.

ILS also supports a range of libraries using Data General Corp. Eclipse series, Digital Equipment Corp. PDP-11 series and IBM Series/1 CPUs in a dedicated mode, the vendor said.

For small installations, ILS is priced at about $75,000 and up from Avatar Systems, Inc., P.O. Box 498, Poolesville, Md. 20837.

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Portfolio Tool Gets Tax Changes

PITTSBURGH, Pa. — On-Line Systems, Inc. has incorporated the changes in fixed-asset accounting that resulted from the Economic Recovery Tax Act of 1981 into its IBM version of the Portfolio Fixed Asset System.

The software changes reportedly allow a company to depreciate its fixed assets using the various tables and methods prescribed in the law. All clients using the system who are currently under maintenance will automatically receive the change.

The package costs $20,000 from the firm at 115 Evergreen Heights Drive, Pittsburgh, Pa. 15229.

Manufacturing Applications

Wang Fits Three Vendors' Packages to VS

LOWELL, Mass. — Wang Laboratories, Inc. announced the availability of three manufacturing application packages offered by three independent vendors for the company's Wang VS.

All the packages were initially developed for other equipment. They have been modified and/or enhanced to fit Wang's gear.

The Manufacturing Control System (MCS) from Computer Technology, Inc. is a five-module package written in Cobol and provides management with current information to aid decision making in the manufacturing environment, the company said.

The Planning and Control System (Pacs) offered by Manufacturing Resource Management is a closed-loop system designed to provide management with current information on production schedules, capacity plans, material plans and product and job costs, the vendor claimed.

The advanced Manufacturing, Accounting and Production System (Amaps) offered by Conserv Corp. has nine modules and provides schedules, capacity plans, load reports and exception reports generated by the system to control costs and inventory levels, the company said.

MCS is priced at $20,000 to $30,000, Pacs at $40,000 to $50,000 depending on modules selected and Amaps at $25,000 to $30,000 per module from Wang Laboratories, Inc., One Industrial Ave., Lowell, Mass. 01851.

File-Oriented 'Psypher' Adds NBS Data Encryption Standard

OAKLAND, Calif. — Prime Factors, Inc., a firm specializing primarily in security applications, has added the National Bureau of Standards' Data Encryption Standard (DES) to Psypher, its file-oriented software encryption system.

The implementation, known as Descrypt, is in highly optimized assembly language and is in accordance with the U.S. government's definition of the DES algorithm.

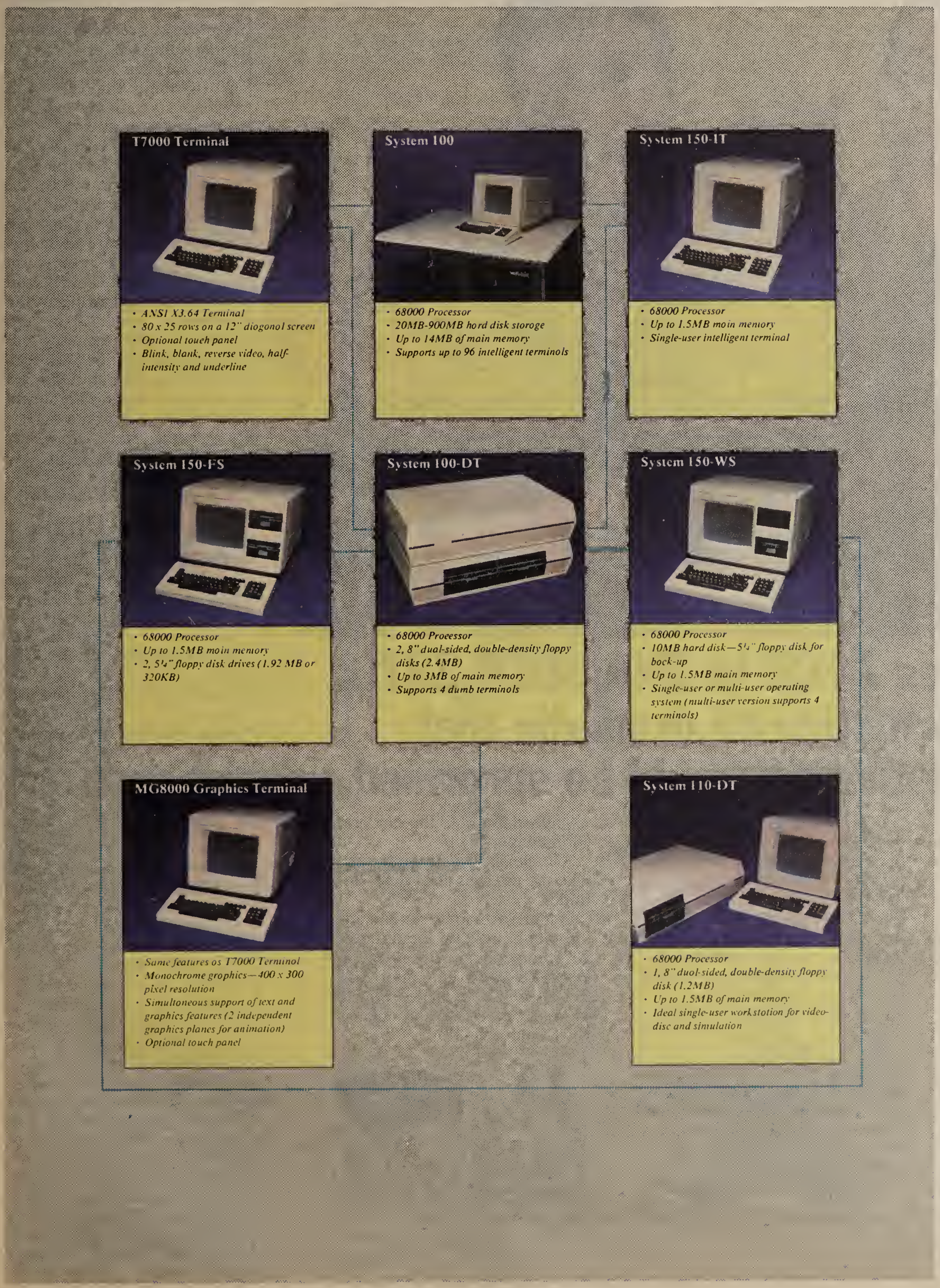
Descrypt is also available as a callable module interfacing with Cobol, BAS, PL/I, Fortran and other languages. Versions are available for the IBM 360, 370, 30 series and 4300; the Digital Equipment Corp. PDP-11, Decsystem-10, Decsystem-20 and VAX-11; the Data General Corp. Nova, Eclipse and MV800 systems; Control Data Corp. 6400, 6600, 7600 and Cyber systems; and the Wang Laboratories, Inc. VS systems.

Prices range from $15,000 for mainframes to $600 for minicomputers. Prime Factors is located at 6529 Telegraph Ave., Oakland, Calif. 94609.

Free Newsletter On Software Out

LOS ANGELES — A free six-page newsletter covering a variety of computer software topics is available from Informatics, Inc.

The current issue of "Datastream" reports on industry efforts to set software taxation standards, offers DP departments tips on systems security and tells how to conduct inspections. The newsletter is available by writing to "Datastream," Informatics, Inc., Suite 800, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.



T7000 Terminal
- ANSI X3.64 Terminal
- 80 x 25 rows on a 12" diagonal screen
- Optional touch panel
- Blink, blank, reverse video, half-intensity and underline

System 100
- 68000 Processor
- 20MB-900MB hard disk storage
- Up to 14MB of main memory
- Supports up to 96 intelligent terminals

System 150-IT
- 68000 Processor
- Up to 1.5MB main memory
- Single-user intelligent terminal

System 150-FS
- 68000 Processor
- Up to 1.5MB main memory
- 2, 5¼" floppy disk drives (1.92 MB or 320KB)

System 100-DT
- 68000 Processor
- 2, 8" dual-sided, double-density floppy disks (2.4MB)
- Up to 3MB of main memory
- Supports 4 dumb terminals

System 150-WS
- 68000 Processor
- 10MB hard disk—5¼" floppy disk for back-up
- Up to 1.5MB main memory
- Single-user or multi-user operating system (multi-user version supports 4 terminals)

MG8000 Graphics Terminal
- Same features as T7000 Terminal
- Monochrome graphics—400 x 300 pixel resolution
- Simultaneous support of text and graphics features (2 independent graphics planes for animation)
- Optional touch panel

System 110-DT
- 68000 Processor
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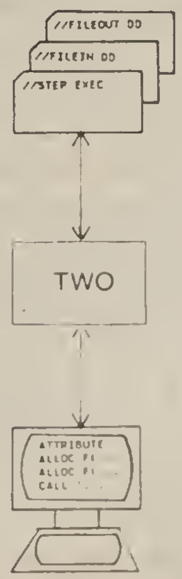
- Up to 1.5MB of main memory
- Ideal single-user workstation for video-disc and simulation

Translating JCL Statements
and
TSO Commands



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ICS Offers Print Spooler

PHOENIX — Independent Computer Systems, Inc. (ICS) has announced a print spooler for the Honeywell, Inc. Level 6/DPS 6 minicomputer.

The ICS Print Spooler reportedly provides the capability to supervise up to 100 devices simultaneously. Its functions include forward and back spacing of reports, selection of the order of jobs to be printed, provision of print control characters to any device and print to a printer connected to a terminal. The vendor said the product requires Honeywell Gcos MOD400 Vdam and does not require modifications to Honeywell software.

The ICS Print Spooler is priced at $2,500 with quantity discounts available from the vendor at Suite 106, 8686 N. Central, Phoenix, Ariz. 85020.

'Q/Zoom' Lists Quotes on HP 3000

LEXINGTON, Mass. — An interactive program that enables the Hewlett-Packard Co. 3000 computer to produce price quotations has been announced by Wallach & Shepherd Associates, Inc.

On command, Q/Zoom will print selected screens or the entire set of screens representing the details of a price quote while generating a sequential file from which the user can produce custom reports, the vendor claimed.

A quote is prepared by breaking a project down into its component parts, with each level having as many subordinate levels as necessary to represent the detail of the level above.

Q/Zoom is priced at $4,500 from Wallach & Shepherd Associates, Inc., 3 Wallis Court, Lexington, Mass. 02173.

Oil, Gas System Offered For PDP-11 Equipment

PITTSBURGH, Pa. — Transcomm Data Systems, Inc. introduced its Oil and Gas System for Digital Equipment Corp. PDP-11 equipment as an addition to its Tolas software line.

It claimed the package is the only Basic-Plus-2 RSTS-based software to control the accounting operations of energy producers. It reportedly interfaces to the standard accounting systems of accounts receivable, accounts payable and general ledger.

The package was designed to distribute the costs and revenues of energy exploration and production. The user establishes a data base of information concerning each property, lease and well, and the Oil and Gas System handles the interrelationships, issues invoices and payments and tracks and reports on each completed distribution transaction, according to the vendor.

The software is priced at $8,000, Transcomm Data Systems, Inc. said from 1380 Old Freeport Road, Pittsburgh, Pa. 15238.

KLC Unveils Payroll System For Four-Phase

PASADENA, Calif. — A payroll/personnel software package said to include up to 10,000 company, division or department combinations has been announced by KLC Corp.

Originally developed as part of KLC's turnkey computer system for the garment industry, KLCPay features weekly, month-to-date, quarter-to-date, year-to-date and perpetual information and reporting.

The package also features gross-to-net payroll, minimal number of special forms, employee profiles for personnel records, multiple tax districts and multiunion reporting, the vendor said.

KLCPay utilizes Four-Phase Systems, Inc. computers using the Idos operating system, Data-IV terminal control program and Cobol. A minimum of 5M bytes of disk, a CRT terminal, printer, decimal instruction set and 96K bytes of memory are required.

Base price is $4,000 including documentation, object programs, JCL and one day of training. KLC is located at Suite 220, 2500 E. Colorado Blvd., Pasadena, Calif. 91107.

ASCII
SNA/SDLC 3276
"Is that a full-screen spinning wheel?"

PCI announces ASCII to SNA/SDLC 3276: a transformation so dramatic that even Rumpelstiltskin would be surprised.

"Forsooth! What's this?"

"Making ASCII terminals SNA-compatible is the transformation of the '80s, Rumpel."

"But what about spinning flax into gold?"

"We don't need gold. We're effecting vast savings through protocol conversion."

"Does that mean big gilders?"

"Really big gilders."

"And what, prithee, is protocol conversion?"

"Well, PCI's 1076 allows us to connect 'dumb' ASCII terminals to IBM using SNA/SDLC protocol. The 1076 looks like a 3276 to the IBM host."

"Egad! Why would you want to do that?"

"For one thing, when we introduce SNA for the first time, we don't have to replace a lot of non-SNA terminals. On the other hand, we can buy the least expensive new or previously-owned ASCII CRTs and printers and use them as if they were full screen 3278s and 3287 printers. And we can dial into the 1076 from anywhere in the world. It's not possible any other way."

"Odds bodkins!"

"Best of all, we can take advantage of SNA's virtually error-free data transmission. No change of software. No special support. In a phrase, we make our non-IBM world IBM-compatible."

"And that's better than gold?"

"Indeed it is. . .to the modern DP manager."

"Oh, fie! Do you think they'd take my old spinning wheel on a trade?"

Call or write for a complete information package about the PCI 1076 immediately. Phone toll-free **800-423-5904** (in California: 213-716-5500). Or write PCI, 6430 Variel Avenue #107, Woodland Hills, California 91367.

PCI
PROTOCOL
COMPUTERS, INC.

Also contact: Newcorp Products, Inc., Aston, Pennsylvania 19014, or call 800-345-8278 (in Pennsylvania, call 215-485-8180).

MAI Offers Rental Tool

SANTA ANA, Calif. — Software designed to accommodate the accounting and control requirements of commercial and residential property management has been unveiled by the Applications Software Corp. of Management Assistance, Inc. (MAI).

Operating on MAI's Basic Four processors, the Property Management System provides management reports for keeping track of day-to-day operations. The system can preprint rent receipts, compute late charges, and generate rent increase or delinquency letters automatically.

The system will also calculate charges for common area maintenance, interest on security deposits and percentage rents when applicable.

The price for a typical residential property system starts at $14,000; a typical commercial system starts at $18,00. The cost of the combination system starts at approximately $21,000.

Applications Software Corp. can be reached at P.O. Box C-11921, Santa Ana, Calif. 92711.

CCMS Works On Prime Gear

CAMBRIDGE, Mass. — A Comprehensive Computerized Marketing System (CCMS) for use on Prime Computer, Inc. equipment is available from Orion Research here.

It consists of three major sections called Literature Request Processing and Lead Assignment, Sales Lead Follow-Up and Dealer Lead Follow-Up.

CCMS was designed to fulfill requests for literature, assign prospective customers to sales representatives, monitor follow-up activities and maintain information about customer industries and application.

The software also screens leads on-line and provides reports for analyzing marketing strategies, the vendor said.

CCMS reportedly utilizes Primos O/S, Prime DBMS, Fortran 77 and Forms.

It is priced at $100,000 plus, depending on the number of modules selected, Orion said from 840 Memorial Drive, Cambridge, Mass. 02139.

Time Accounting Package Unveiled for Prime Users

WOOD DALE, Ill. — A time accounting package for users of Prime Computer, Inc. systems where the user has the system source code has been announced by Computronics, Inc.

Usage Accounting allows a user to record information about what someone is doing on his system, making the package useful for service bureaus and consulting houses wanting to account for their programmer's time on various projects.

Each time a user types a command and when the command has finished executing, the software will store the log-in name, user number, command typed, date and time the command was executed and the elapsed CPU and disk I/O time since log-in, the vendor claimed.

Usage Accounting is priced at $500 from Computronics, 130 N. Ash, Wood Dale, Ill. 60191.

On-Line Maintenance Package Designed for IBM System/34

GOLDEN VALLEY, Minn. — An on-line, interactive equipment preventive maintenance package for the IBM System/34 was announced here by the Elke Corp.

Called EMS/34, the software is designed for use by companies to control maintenance for any type of equipment ranging from a lawn mower to a nuclear power plant, the vendor said.

It reportedly provides a single source of complete identification for each piece of equipment; plans, schedules and monitors equipment lubrication, periodic maintenance and safety inspections; and tracks machine component repairs and exchanges.

All EMS/34 procedures are run from user menus and multiple workstations can run the software at the same time. Data entry is interactive with on-line editing and immediate updating, the vendor added.

EMS/34 is available for a one-time license fee of $5,000 or can be leased from the Elke Corp. The vendor is located at 998 Zane Ave. N., Golden Valley, Minn. 55422.

System/34-Based OBE System Debuts

LITTLE ROCK, Ark. — Arkansas Systems, Inc. has announced an IBM System/34-based On-Line Banking Environment (OBE) software system.

Comprised of an On-Line Central Information File module and an On-Line Automatic Teller Machine (ATM) module, the system includes provisions for a Diebold ATM system to be directly attached to the System/34, the vendor said.

Although the OBE is meant to be largely independent of the application processing environment, the OBE is interfaced to the financial institution's application processing, whether done in-house on the System/34, in-house on a mainframe or remotely on a mainframe.

The OBE costs $15,000 from the firm at Suite 206, 8901 Kanis Road, Little Rock, Ark. 72205.

Harris Releases Assets System

MILWAUKEE, Wis. — Harris Data Service, Inc. has released its multicompany Fixed Assets Management application software for the IBM System/34.

On-line features include asset inquiry, data entry editing and full integration with the Harris Data Service General Ledger software package.

The package can be purchased on a license basis including source and object code, run procedures and user-oriented documentation for $2,500. A demonstration diskette of the package is supplied with no obligation to purchase. Harris Data Service is located at 11629 W. Dearbourn Ave., Milwaukee, Wis. 53226.

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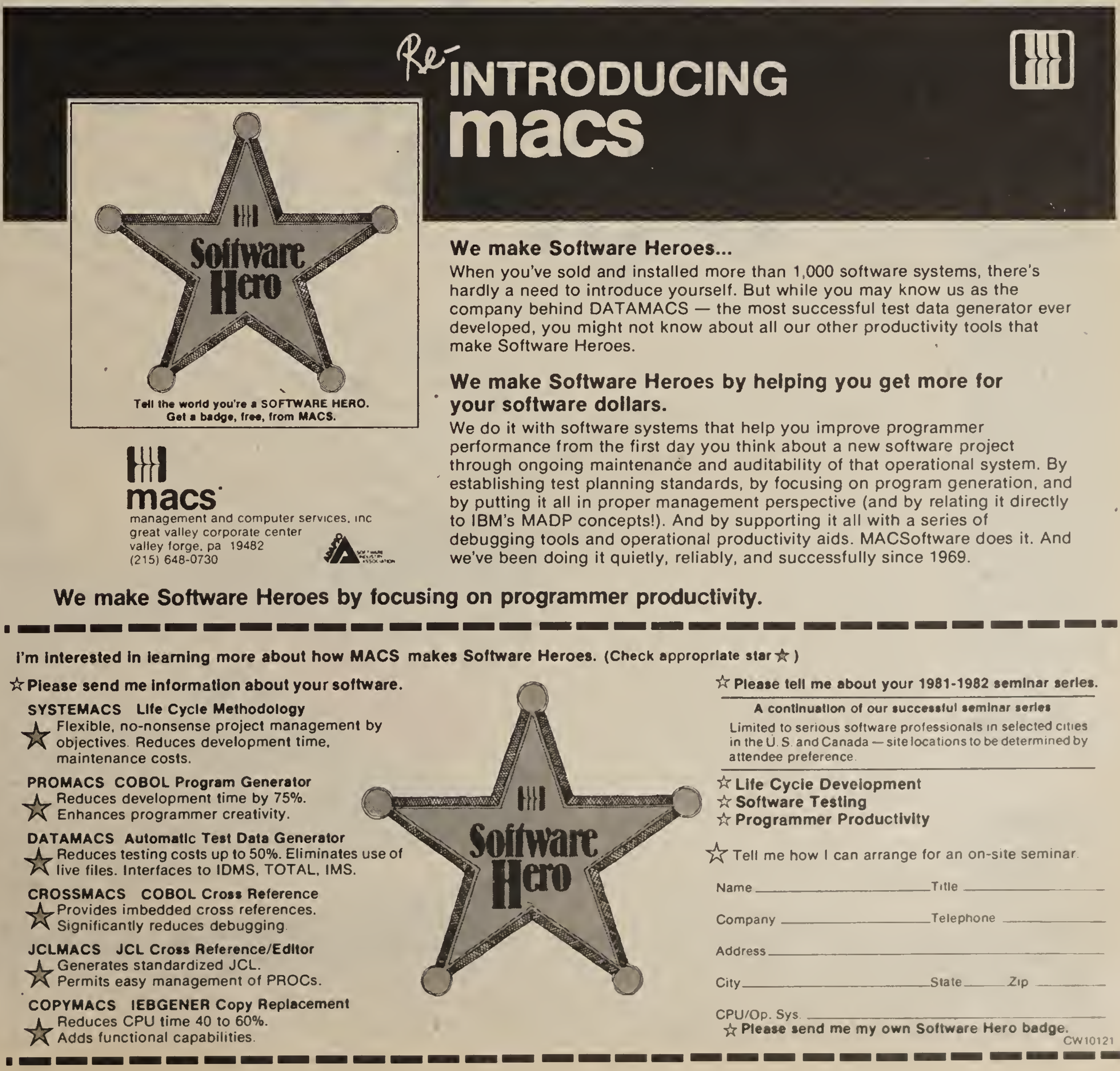

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The Case for Output Management Systems

How to get control of your organization's growing appetite for printed data and word processing output before it eats up productivity and profits.

By Ken Schwaber

As data processing systems have decreased in price while increasing in functionality, organizations have found more ways to harness the power of computers as an information resource. This increase in computer usage has presented many new problems, among them the problem of coping with the ever-growing output.

DP facilities have tried to develop effective techniques for coping with the flood of printed output, but the added load of digital output created by electronic mail, word processing and other office automation systems has intensified the problem of con-

(Continued on In Depth/2)

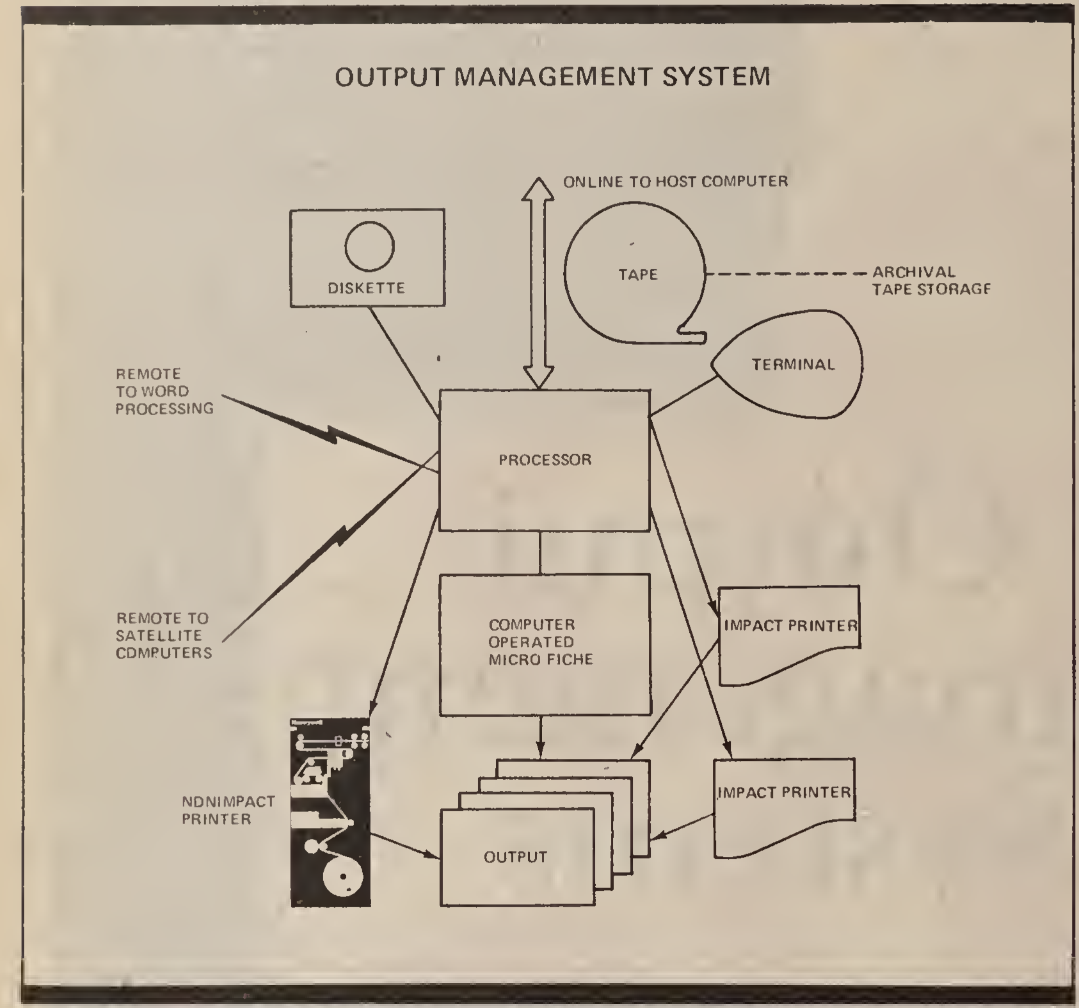

Figure 1

(Continued from In Depth/1)

trolling what information is printed and to whom the output is distributed. Managers and other corporate executives often have little or no use for the voluminous reports and memoranda that cross their desks. This glut of paper threatens to nullify the very productivity gains made possible by computer-generated output in the first place.

For example, consider the secretary who needs to mail 100 copies of a 50-page report. He can type and copy the report himself — probably in two days — if he has nothing else to do. Or he can give the project to a word processing operator who will spend a day running off the copies on a letter-quality printer. Or he can send the report to the print shop, which can make 100 copies in one hour — after waiting, say, two days to schedule the job. In all cases, the secretary still must address and mail the reports by hand.

A second example of lost productivity is the computer-generated report. After the information is processed at more than 1 million instruction/sec, the reports are printed at about 2,000 line/min. Reports are printed on 14-in. by 11-in. paper — not a very convenient size for a world that is accustomed to 8½-in. by 11-in. reports from a typewriter. If multiple copies are needed, the alternatives include printing multipart forms (up to six copies per pass) and then sending the reports to a decollating machine, which separates the copies prior to distribution.

This approach presents problems: What to do with the carbon paper? How do you get your hands clean? Who gets the top (best) copy and who the last (worst) copy of the report? If the computer printout of the report is taken to the print shop, photostat machines there can optically reduce the report to 8½ inches by 11 inches, but multiple copies of that document still must be printed.

A last example of lost productivity: A vice-president of a company decides he no longer needs a copy of the detail trial balance; he feels confident that the system is working fine. He so notifies data processing and is assured that the 3,000-page report will no longer be sent to him. That's fine — but after the fifth time he calls, the report keeps appearing on his desk, leading him to wonder if anyone is minding the store!

The Solution

Output management is a relatively new idea in business data processing — one whose time clearly has come. An output management system is an integrated approach that combines digital output received from office automation, word processing and distributed or centralized computers and then prints the output on the most appropriate device(s).

Specifically, an output management system boosts productivity in six ways:

- It accepts digital output from such sources as office automation, word processing, distributed data processing and mainframe computers via phone lines using a wide range of communications protocols.
- It accepts digital output from magnetic disks, diskettes and tapes.
- It stores the information in a standard format, including code conversion and word processing translation.
- It appends preestablished control information (such as quantity, page size and distribution list) to reports, letters and memos or accepts and recognizes this control information as part of the digital output received.
- It directs the output to be printed

(Continued On In Depth/4)

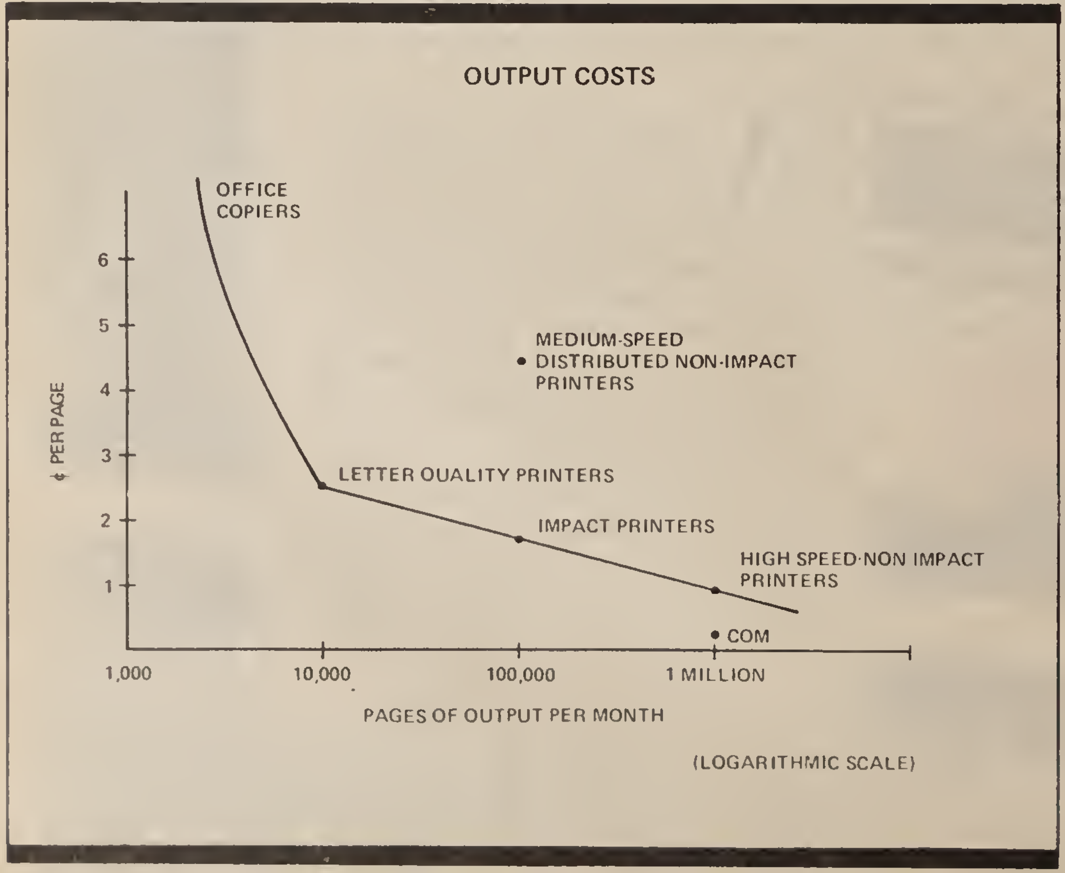

Figure 2

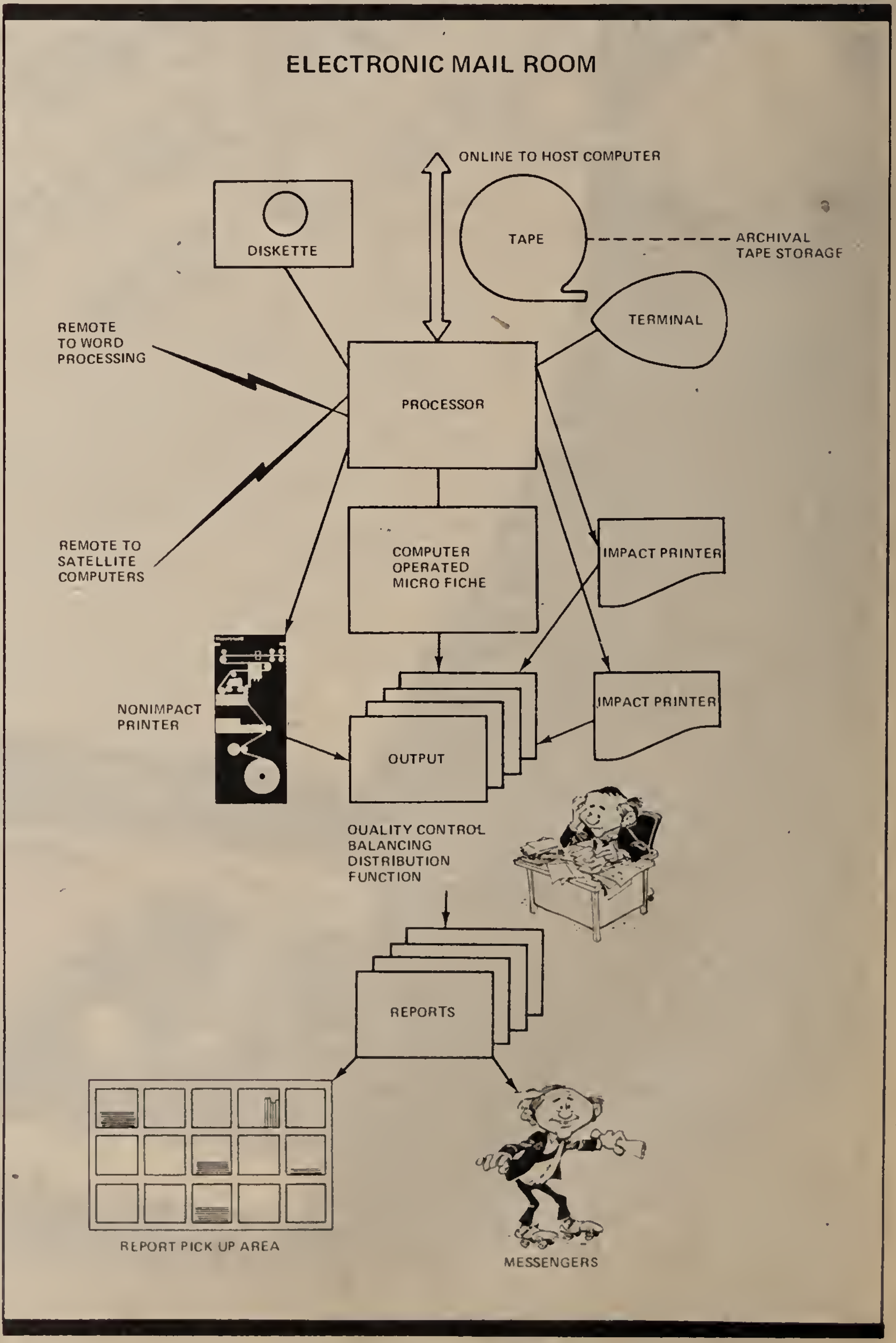

Figure 3

Rapid Transmit Authorities.

TI's Portable Models 785 and 787 Data Terminals are experts on interactive communications.

With TI's *Silent 700** Models 785 and 787 Portable Data Terminals, you can put state-of-the-art technology right at the heart of your business. Featuring TI's unique dual-matrix thermal printhead, these innovative data terminals can minimize your communications costs with speedy 120 characters-per-second printing. Weighing only 17 pounds each, the portable 785 and 787 can improve your application efficiency, wherever your work takes you.

The Model 785 Portable Data Terminal combines speed with remote access capabilities. With the 785's built-in 300/1200-bps acoustic coupler, users are able to transmit and receive data using a standard phone and electrical outlet. Other standard features include automatic modem selection and compatible speed selection to let you optimize your on-line communication time.

The Model 787 Portable Communications Data Terminal can handle your application needs with its cost-saving, built-in standard features. The 300/1200-bps direct-connect internal modem allows users to plug directly into a standard telephone data jack for greater communications flexibility. The 787 also features memory dialing and originate/automatic answer operations for additional time and cost savings.

For information retrieval, remote sales order entry, and a variety of other interactive applications, the Models 785 and 787 speed your communications from coast to coast.

TI is dedicated to producing quality, innovative products like the Models 785 and 787 Portable Data Terminals. And TI's hundreds of thousands of data terminals shipped worldwide are backed by the technology and reliability that come from 50 years of experience.

Supporting TI's data terminals is the technical expertise of our worldwide organization of factory-trained sales and service representatives, and TI-CARE†, our nationwide automated service dispatching and field service management information system.

If you would like more information on the Models 785 and 787 Portable Data Terminals, contact the TI sales office nearest you or write Texas Instruments Incorporated, P.O. Box 202145, Dallas, Texas 75220, or phone (713) 373-1050.

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(Continued from In Depth/2)

to the most appropriate devices, such as an impact printer, letter-quality printer, high-speed nonimpact printer or computer output microfilm or mirofiche.

- It allows full operator control for attaching or overriding control information, changing priorities, restarting and redirecting digital output to the various media.

The physical components of an output management system (see Figure 1 on In Depth/2) include the various I/O devices (such as diskette, tape and telecommunications lines) for transferring an organization's digital data; a processor with output management software for accepting, reviewing, organizing and controlling the data to be printed; disk storage for buffering and recording the data; and output devices (the various printers) for converting the data into hard-copy output.

Picking Output Devices

The key to making output management systems operate effectively is the use of the proper output device(s) for each job to be printed. A wide variety of output devices can be included in an output management system:

Impact printers produce low- to medium-quality output at medium speeds, ranging from 300- to 2,000 line/min. Impact printers are primarily used for medium-volume, stand-alone print requirements, ranging from 100 to 200,000 page/mo. Two applications are unique to the impact printer: check printing, where the impact of the print train onto the check renders the account number and dollar amount unalterable; and multipart forms, such as turnaround documents and "crash-through" envelopes.

Letter-quality printers typically operate at speeds of 30- to 125 char./sec and use ink-jet or impact technologies. They produce the clearest, highest quality form of output. The finished document appears to have been typed. This technology is the most appropriate when formality or the "personal touch" is sought.

Computer output microfilm/microfiche (COM) is a technique for storing large amounts of data on photographic film. COM is primarily used for archival purposes and is also practical where high-volume reports are needed by users who have microfilm/microfiche readers and who have no need to write on the pages before forwarding them to the next user.

Nonimpact printers, rapidly gaining popularity, are most appropriate for the bulk of printed output. They are fast — up to 18,000 line/min — and versatile, with the ability to print forms and variable data simultaneously, to print on both sides of a page at the same time, to print in various colors and to collate reports automatically.

Volume nonimpact printing and COM are particularly cost-effective when print volumes exceed 400,000 pages monthly.

An output management system allows a report to be printed on the

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most. cost-effective and desirable equipment, selecting from COM, nonimpact printers, impact printers, or letter-quality printers. The cost of a page of output for each of these technologies is shown in Figure 2 on In Depth/2.

Quality Maintained

Since an output management system can have different output devices, the costs of producing a full set of reports can be reduced and the impact still retained. For example, a 1,000-page report with 10 copies costs $180 when printed on an impact printer ($.018 per page). All recipients get the same quality output.

With an output management system, control information could be established beforehand so that this report would be printed as follows: eight copies printed on the nonimpact printer for $96, one copy printed on the impact printer for $18 and one copy printed on COM for $1.

By differentiating the copies of the report to the most appropriate technology, the organization has reduced the cost from $180 to $115 — a savings of $65 — and each recipient has received the report in the most appropriate form.

When this range of flexibility and cost savings is spread over an organization's entire output load, the impact is significant. For example, if the above report were daily, annual savings for that report alone would be $16,900.

Logically, an output management system is situated in a specific physical location within an organization — creating an "electronic mailroom" (see Figure 3 on In Depth/2).

Just as an organization's conventional mailroom is used for receiving documents and distributing them within the organization, the output management system can be the hub of an electric mailroom that receives computer reports from several points in an organization and then prints and distributes these reports.

Data from word processing can be hand-carried in the form of a diskette to the electronic mailroom or transmitted there via phone lines. Similarly, data from DP sites can be telecommunicated to the electronic mailroom or received there directly via channel connections from host computers. Input from newly created or archival tape files can be processed in the same manner.

Control Information

Control information is needed at the electronic mailroom, containing instructions on handling each document that is received.

In conventional mailrooms, this information is typically stored in control books, but now the control information can be stored on the output management system, where it can be created or modified on-line. Or this control information can be received as part of the documents to be printed.

Control information for each document to be printed could contain: originator and time/date of transmission, quality and size of paper to be

(Continued on In Depth/7)

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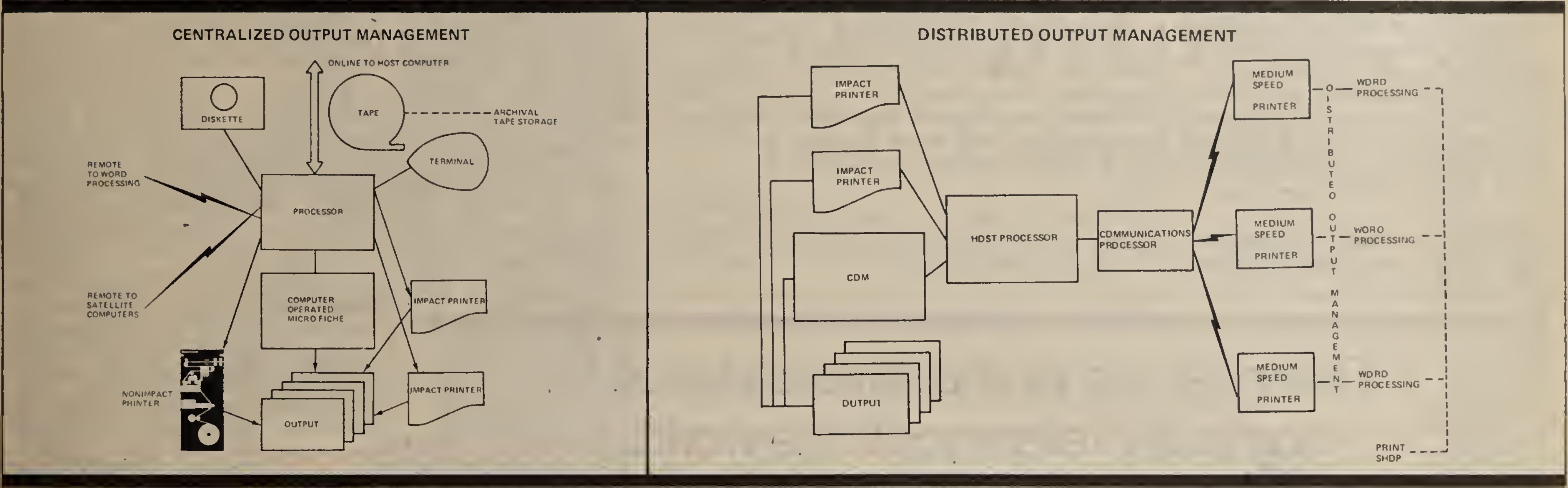

Figure 4

(Continued from In Depth/5)

used, number of copies to be printed, routing information for each copy, priorities, forms to be printed automatically with variable data, preprinted forms to be used, character font to be used, pitch, lines per inch and output medium.

Making the Transition

The central data processing facility is the usual place to start the transition to an output management system. The greater volume of reports is generated there (with the potential for substantial savings by printing on the most cost-effective medium), and personnel are available who are skilled in operating *systems* — the operations staff.

Also, the data processing facility probably already has the equivalent of an electronic mailroom in its own output processing staff. Their charter can be expanded to include the automated tools of the output management system.

The transition could start by converting the manual control information used by the output processing staff to automated control information on the output management system. Once this is completed, the multiple channels from the mainframe computers to impact printers could be reduced to one (or a few) channel connections to the processor within the output management system and the printing can begin. The mainframe computers are freed up for other work when this is completed — only one copy of each report needs to be transmitted. Control information specifies how many copies to print and data can be transmitted in blocks substantially larger than printers normally accept.

When the output management system is intially implemented, the scope of output devices attached determines the degree of savings that can be realized. Nonimpact printers provide savings in minimizing post-processing functions such as bursting and decollating. Other savings are realized in paper and forms costs. Furthermore, COM offers potential for very low-cost output when user requirements for the reports allow its use.

Once the control information is established and the reports are being printed at the output management system, the control information can be fine-tuned to direct the printing of reports on the medium most appropriate to the end user of the report (and the most cost-effective).

The central data processing work load has been converted and is now being processed on the output management system — so add a diskette reader. The secretary who needs 100 copies of a report can drop off a diskette and pick up the copies in an hour (or they can be delivered).

Auto-Answer Modems

Put auto-answer modems on the output management system. Word processing, remote or distributed computers can call up and transmit reports for printing and distribution.

Default control information can be established for diskette or "call-in" reports — for example, identify "control block C1N4" on the first line of the report and five copies will be printed, one on COM and four on the nonimpact printer — or all of the control information can be specified at the beginning of the report in a site-standardized format.

Just one word of caution: Measure the impact of the output management system from the beginning. The savings are hard to believe, otherwise.

The physical location of the output management system depends on the size and complexity of the users. A single facility can be centrally located or multiple facilities can be installed at individual sites (See Figure 4).

Centralized output management systems have the advantage of using a common pool of labor and tapping a single automated source for control information. When a user is to be dropped from a report distribution list, the control information is changed immediately so that the next time the report is produced, one fewer copy and set of routing data are generated.

Smaller Systems

Smaller output management systems also can be placed strategically throughout an organization. These systems typically would accept data only from telecommunications lines or diskettes and produce output on a medium-speed nonimpact printer (2,000- to 3,000 line/min). These small output management systems provide a distributed capability for supporting office automation equip-

(Continued on In Depth/8)

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(Continued from In Depth/7)

ment, but have the following drawbacks when compared with a centralized output management systems.

- *Economy of scale.* Small installations cost approximately 33% of the cost of typical centralized output management system, but offer only 13% of the throughput ($90,000 to $270,000, with 2,700- to 18,000 line/min).
- *Cost-effective.* Small installations typically use only medium-speed nonimpact printers and cannot print archival or volume reports on COM.
- *Operations and maintenance.* Must be performed by office personnel rather than by a centralized output management system staff.
- *Control of data.* Central control information does not exist, so a single change must be effected at all other sites.

Distributed output management system facilities are most appropriate for smaller organizations or divisions of large organizations that are separated geographically. Some of the benefits of output management can be realized while centralized data processing facilities outside service bureaus can be used for other printing and COM.

Conclusion

An output management system is a powerful tool for controlling an organization's output requirements. New computer applications — office automation, word processing, distributed- and remote processing — as well as existing computer facilities can transmit reports to an output management system.

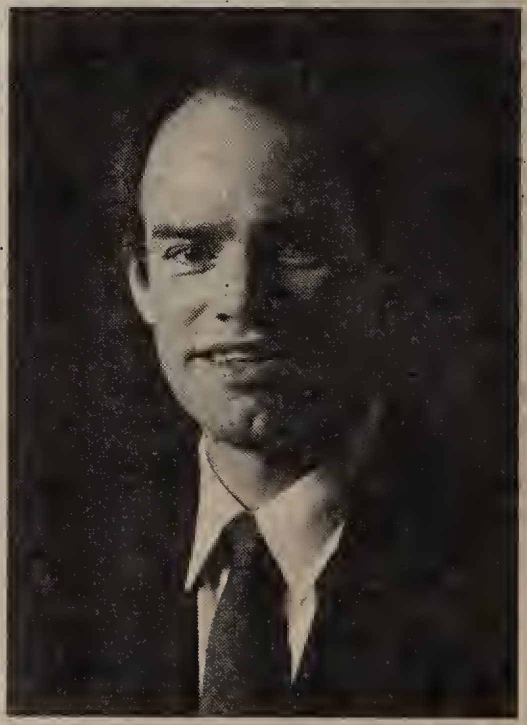
Reports are directed to the most cost-effective, appropriate output equipment — COM, impact printers, nonimpact printers or letter-quality printers — by the output management system. Different copies of the same report can be printed on different media.

Direct savings resulting from an output management system are realized by eliminating printer postprocessing operations, eliminating printer hardware in favor of high-throughput nonimpact printers and reducing paper costs via COM or nonimpact printers.

Indirect savings can be even greater than direct savings. Secretaries are freed from routine copying work (some copies may even be eliminated) and print shop budgets can be cut to reflect lower print loads.

Organizations with combined print shop, word processing and computer-generated output volume in excess of two million pages per month can realize annual savings ranging from $250,000 to more than $1 million by installing a centralized output management system.

A thoughtfully installed output management system can help an organization realize substantial direct savings and make impressive productivity gains.



About the Author

Ken Schwaber is product marketing manager for Page Processing Systems, Honeywell, Inc.'s line of high-speed nonimpact printers. The Page Processing System II/E, introduced at the National Computer Conference in 1981, was the firm's first implementation of its Output Management Systems concept.

Schwaber holds a bachelor of science degree in mechanical engineering from the U.S. Merchant Marine Academy and has done graduate work in computer science the University of Chicago.

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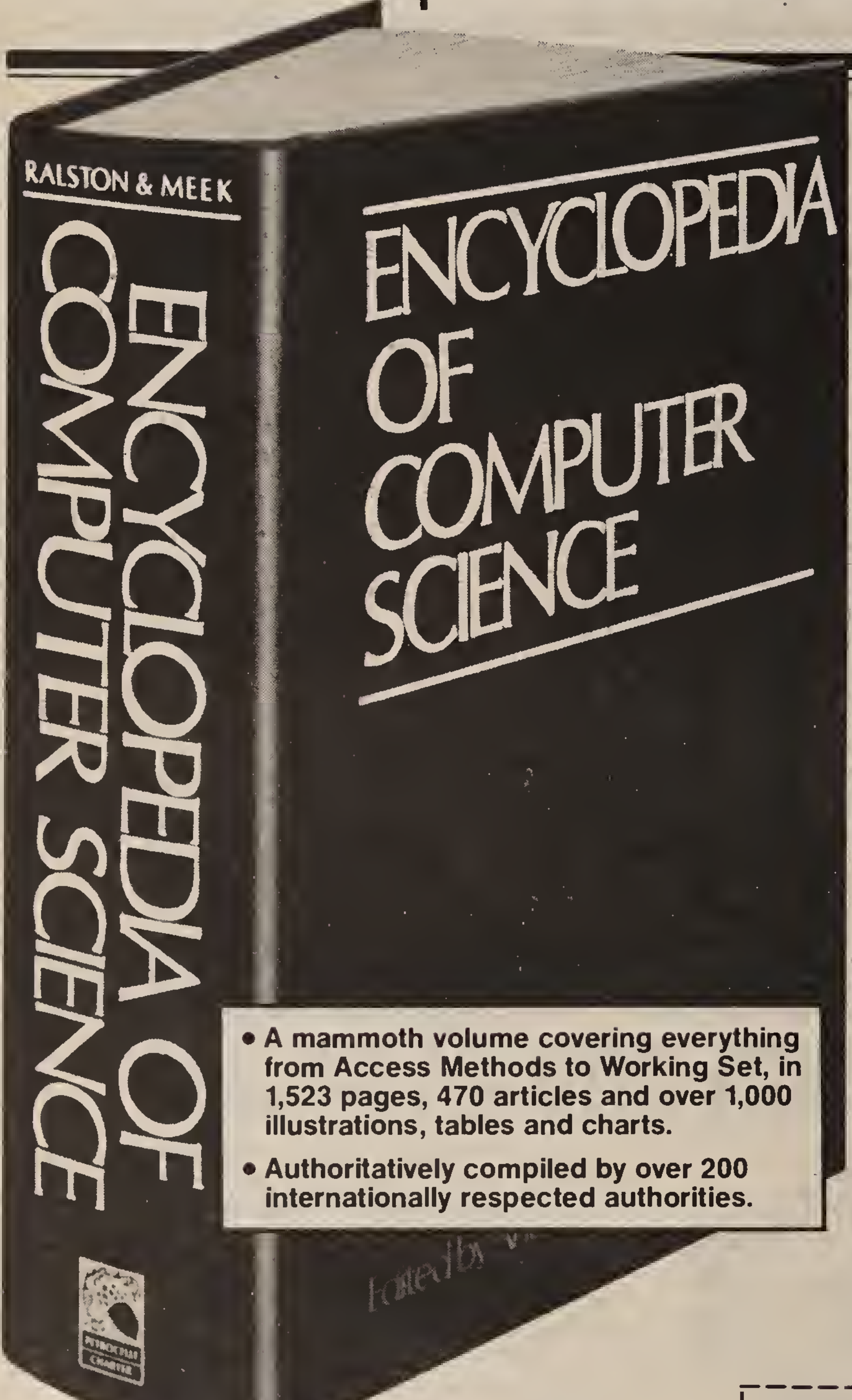
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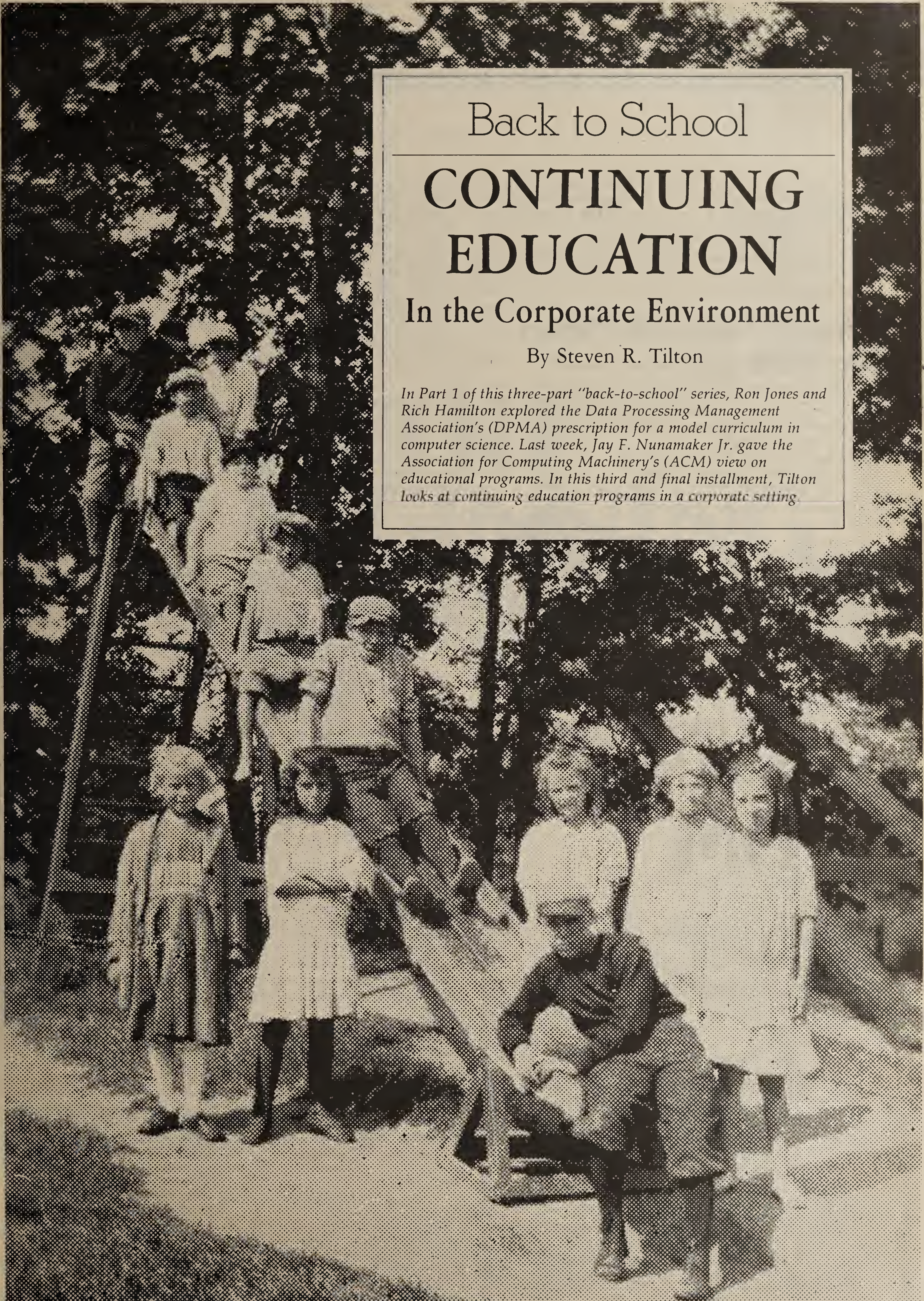

Back to School

CONTINUING EDUCATION

In the Corporate Environment

By Steven R. Tilton

In Part 1 of this three-part "back-to-school" series, Ron Jones and Rich Hamilton explored the Data Processing Management Association's (DPMA) prescription for a model curriculum in computer science. Last week, Jay F. Nunamaker Jr. gave the Association for Computing Machinery's (ACM) view on educational programs. In this third and final installment, Tilton looks at continuing education programs in a corporate setting.

More and more colleges and universities are offering data processing courses in the "continuing education" mode. An increasing number are offering continuing education units (CEU) for these courses. Some data processing training organizations have expressed an interest in this program and the possibility of offering CEUs for their in-house education programs.

What is the CEU? The following definition comes from the *Criteria and Guidelines* booklet published by the Council on the CEU:

"The Continuing Education Unit has been designated as a uniform unit of measurement to facilitate the accumulation and exchange of standardized information about individual participation in noncredit continuing education.

"The CEU is applicable whether information is transmitted from one person to another, from one institution to another, from individual to organization, from employee to employer . . .

"It can be used to measure all levels of noncredit continuing education without regard to age of participants, subject matter, program format or instructional methodology. The CEU permits the individual who desires additional educational experience to look to many sources of continuing education and to select from formats common to the field, while accumulating a uniform record available for future reference."

In a systems analyst's terms, then, the CEU can be defined as 10 contact hours of participation in an organized continuing education experience under responsible sponsorship and qualified instruction.

Each element included in the definition of the CEU is an integral part of the larger concept of developing an educational experience of sufficient merit to be documented in permanent form on the record of the individual participant.

Criteria for Issuing

How, then, can a training program issue CEUs? The Council on the Continuing Education Unit has established criteria for issuing the units, which we will examine in detail.

Planning. The program or activity is planned in response to the educational needs of a target population or clientele group. This planning includes the opportunity for input by representatives of the immediate clientele group, as well as by other knowledgeable individuals having content expertise and an appreciation of the educational objectives to be met.

This is, of course, the main criterion for any good in-house education program. Training will not happen if it is not planned.

DP training, where successful, is treated just like any other DP project. Deltak, Inc.'s Delta 1, for example, is a means to plan, organize and control the training function. A training plan is most likely to be followed if it is designed by the employee and his manager.

Timely, Job-Related

When the training is "available" but not planned, it generally fails. The students need to have some input to their program.

In many DP installations today, training is offered somewhat like a menu in a Chinese restaurant — pick this course from Column A or that from Column B, depending upon the mood. No one does a needs analysis. Training needs to be timely and job-related.

Objectives. A clear statement of rationale, purposes and goals is prepared for each educational activity prior to its initiation.

Each and every course must have clear objectives. The student needs to know what is expected, what will be taught and the standard of performance required for successful completion.

Robert F. Mager's *Preparing Instructional Objectives* (Fearon Pitman Publishers) can provide invaluable assistance in this area.

Instruction. Qualified instructional personnel are directly involved in conducting the educational activity.

Since the majority of DP training today is done by learner-paced multimedia, instruction might seem to be a problem.

Students usually complain that they don't have an instructor to answer their questions. A good tutorial program not only alleviates the students' fears (and answers questions), but meets the requirements for instruction.

The tutor is not there to teach the material — the multimedia course does the teaching — but to facilitate the learning process. The tutor can answer questions, plug in the shop's particular standards and procedures, explain answers to quizzes and final exercises and so on.

The tutor need not be a "guru" in the subject, but merely someone who has had more experience than the trainee. In fact, the tutorial session can be a learning reinforcement for both parties.

'Tutorials Work'

The DP manager should realize that tutorial sessions take place whether they are formalized or not. A person taking a class will seek out a known "expert" in the subject to have the questions answered.

It is far more cost-efficient to have this expert give one tutorial to several people at once, perhaps spending 30 minutes, than to spend 20 minutes with four or five people individually throughout the day. Tutorials work. They add the touch of human interface to the program.

Performance. Specific performance requirements for the award of CEU to participants are established before the program is offered.

The education manager at each company will be responsible for establishing performance requirements.

For example, he might stipulate that the student must complete the final examination in the allotted time with no less than 75% of the answers correct. Of course, each company must set its own standards for performance.

Registration. Participant registration must include sufficient detail to provide the necessary information

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for a permanent record of individual participation.

Records. Program administration will include a system for verifying that each participant has satisfactorily completed the activity. An approved list of those awarded CEU must be supplied to the office responsible for preparing and maintaining permanent records for individual participants.

Program evaluation. Evaluation procedures determined during the planning process are used to measure the effectiveness of the program design and operation. The qualitative aspects of CEU programs are to be constantly under review. The method of evaluation should be developed after specific program objectives have been stated and should apply to sponsors, programs and participants.

Every good training program already includes these procedures, but quite a few programs do not keep records.

At the minimum, you need to know who has taken or is taking what courses and when. The training manager as well as DP management needs to know what courses the staff has taken and how long ago. And for planning purposes, by designing an individual training plan with the employee, the manager can be aware of not only the employee's educational needs, for say a year, but when this training can interface with current or future projects.

'Penney's Cares'

One organization, J.C. Penney Insurance Co. of Columbus, Ohio, has been issuing the CEU for two years. Education coordinator Frank Tayim explained, "We feel it is very useful in showing the programmers and operators that Penney's cares about their personal growth.

"While the majority of degreed people seem blase about the CEU, the nondegreed ones really appreciate it. We issue CEUs for both our Deltak training and courses developed here."

It can be seen that organizations running effective training programs would meet the criteria to issue CEUs. Today more than a thousand colleges, universities, professional societies, associations, corporate training departments and other instructional organizations are awarding the CEU. Maybe it is time your department got on the CEU bandwagon too.

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About the Author

Steven R. Tilton is president of Mentor Systems, Cuyahoga Falls, Ohio, a firm specializing in providing a variety of DP training functions. He has been involved in training for more than 15 years and has worked for firms such as Deltak, Inc. and B.F. Goodrich. His BS degree is in technical education, and he is completing a Master's Degree in computer-based education at the University of Akron.

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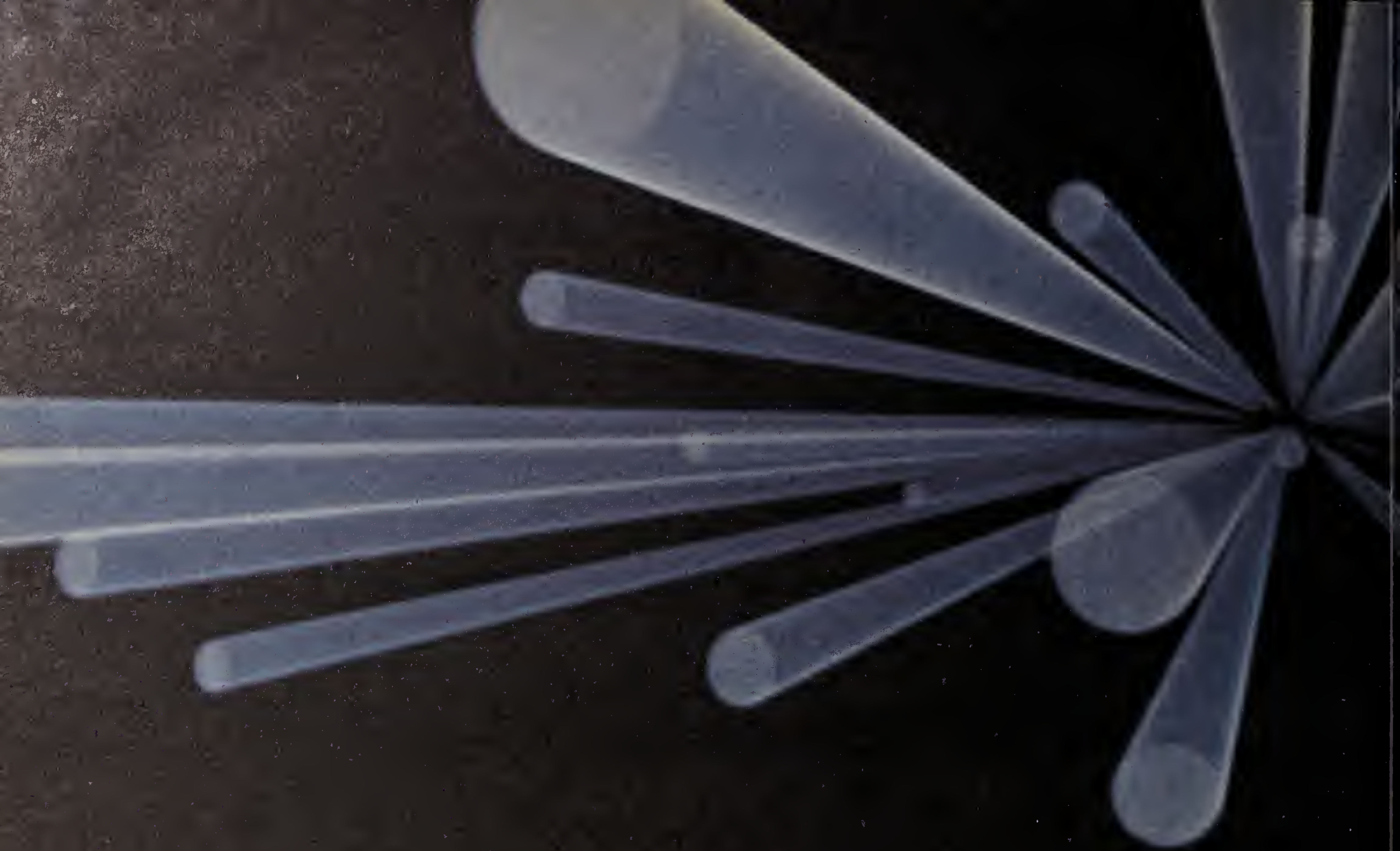

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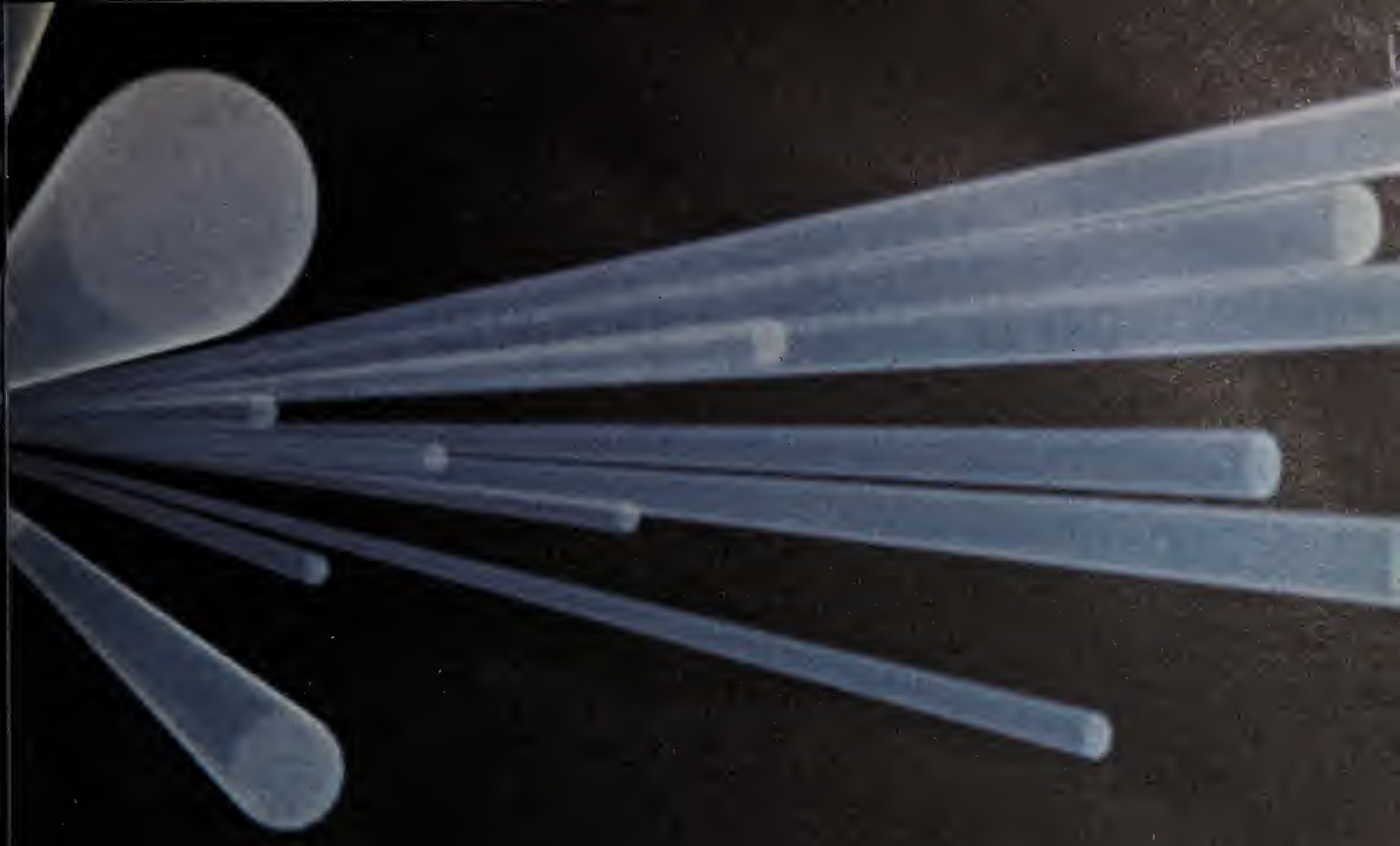

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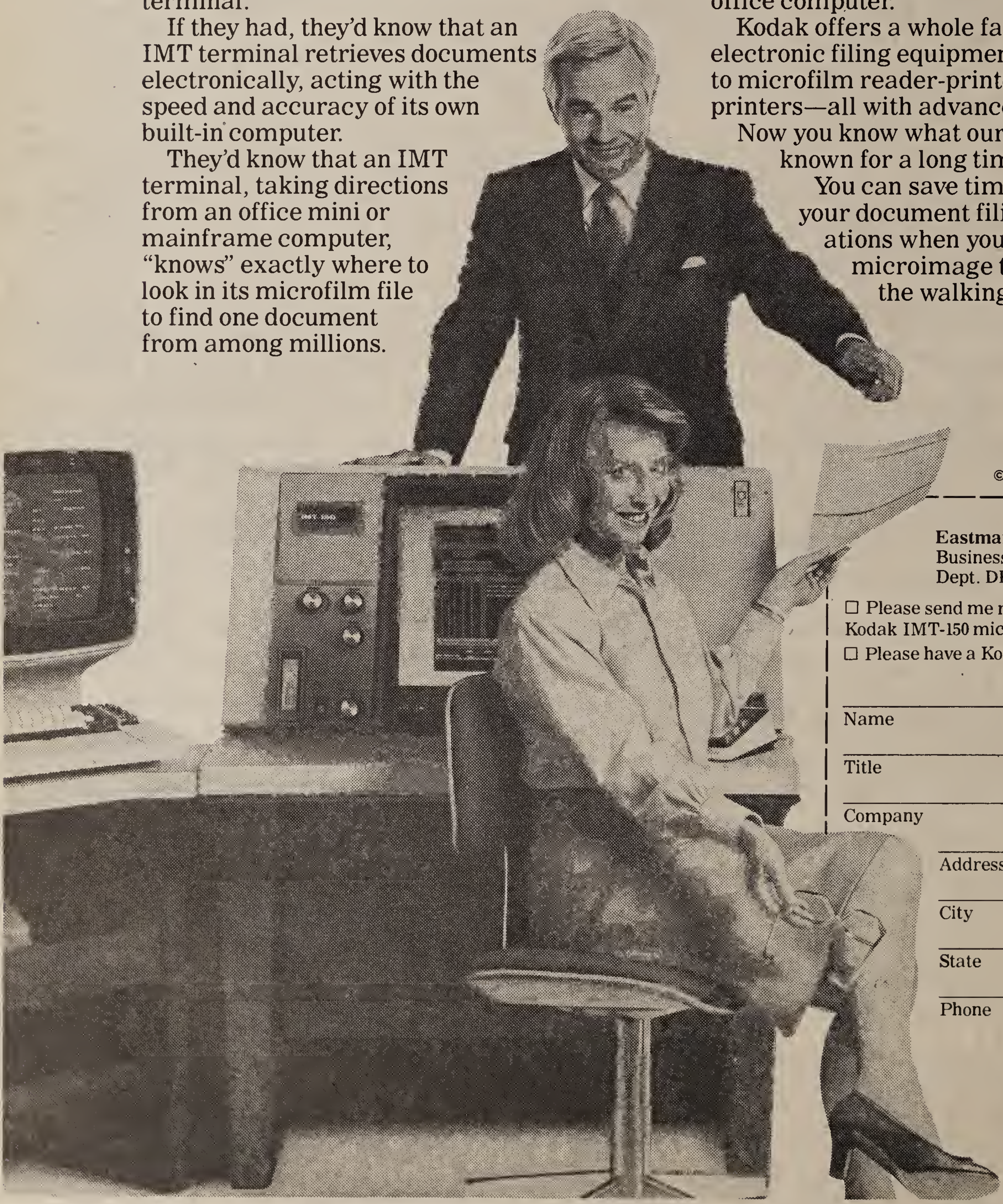

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By Christopher Gray and Darryl Landvater

MRP II SOFTWARE:

The History
The Problems
The Future

Software, all software, has problems. In fact, it is rapidly becoming the limiting factor in the growth of computers. In many cases, the problems in manufacturing resource planning (MRP II) software are merely manifestations of the general and fundamental problems with software.

Most of us have little power to solve these fundamental problems and must find a way to make things work with what we have. In the following discussion of software problems, we include recommendations and suggestions for dealing with each type. Our observations come from experience with making materials requirements planning (MRP) systems work. We have been through the process of implementing and operating a Class A MRP system, and both of us have written detailed commercial evaluations of more than 20 different MRP II software packages.

This is a unique perspective in the industry. Our comments are based on software as it exists today. There is no question that software has come a long way in the last 10 years. However, our discussion is based not on what software is now as compared with 10 years ago, but on software today compared with what it could be if the existing technology were used to its fullest.

(Continued on In Depth/18)

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(*Continued from In Depth/15*)

Few people know what to expect from an MRP software package. The term "package" implies that the software can be plugged in and turned on. Most people assume that it's sort of like installing a washing machine: you take delivery, plug it in, connect it to a water supply and watch it run.

Software packages for MRP II are not like that. Initially, four general areas must be understood: functionality, modifications, bugs and interfacing.

Functionality: Most MRP II software packages are functionally incomplete. This is most common in the area of financial planning using the operating numbers, simulations, scheduling engineering and so on. These areas make MRP into MRP II, and they are fairly new.

Another function typically missing is master production scheduling. Several years ago, only one software package had a complete master scheduling module. Today, many of the software packages provide support for master scheduling. However, quite a few are still weak in this area.

There are also some less obvious areas where the functionality of the different software packages is incomplete. For example, a number of systems do a poor job of displaying the information with which a planner would work. All the information the planner will need may exist in the system, but it may be spread over more reports than he can physically handle at one time. Another example of this lack of functionality is where there is no provision, or only limited provision, to assist in the implementation of engineering changes.

On the other hand, some software packages are quite complete functionally. A number of these systems have been installed with little, if any, modification to the system's functionality. However, typically a company should plan on some functional modification to the system.

Modification: Modification is generally required for three reasons: lack of functionality; need for customized report formats, CRT screen display, field sizes, transactions and so on; and a need to conform to specialized regulatory requirements. An example of such a regulatory requirement would be lot control and accountability in the food or pharmaceutical industries. For all these circumstances, the best approach is to budget some time and money to make the necessary modifications to the system.

Functional deficiencies can be corrected in either of two ways: make the corrections yourself or have the software vendor fix the software. You may be successful in convincing your vendor to fix any lack of functionality in the software, but the time limit for correcting the problems is still likely to put the burden on you.

You will be working within a time frame to implement MRP II, while the vendor will be working to "software development time." Software development time is the estimated time for the job plus a factor that ranges from several months to more than a year. In our examination, at least three software vendors took more than two years to develop master scheduling modules for their software. There are a number of reasons for this delay, but the net effect on you is the same. It generally takes more time than your schedule will allow.

For this reason, the best way to develop a budget for the time and money needed for modifications is to evaluate the software thoroughly. The evaluation should be a detailed comparison of the functions in the software with the functions needed for MRP II. It should identify the missing functions and also indicate the size of the job to correct the problem.

In our evaluation of MRP II software, we always indicate what we feel should be modified and why, and we estimate the size of the modification. Using this information, the organization can determine how to make the required changes and also fit within the required time frame for implementation.

Bugs: Many of today's software packages are complicated. In fact, most are more complicated than they need to be, and this complication creates bugs. When the software is first released, the users become the final stage in the development process as they exercise the software more thoroughly than the developers did and use the software in ways no one had imagined.

But even after the initial rash of bugs has been disposed of, some bugs are likely to continue. Any source of change in the software is likely to generate bugs. If improvements are made to the software, some bugs are likely to result. If a change is made to correct a bug in one area, the result may be a new bug in another area of the software. Fixing this may, in turn, generate another problem and so on. Some people who use complicated pieces of software go by the "rule" that for every two bugs fixed, a new one will appear.

Bug-free software operation is more of a hope than a reality. People have to learn to live with an occasional bug that crops up. This is not unreasonable since the majority of bugs are irritations and inconveniences as opposed to really serious problems. For example, a bug existed in IBM's Pics netting and exception logic for more than seven years before it was identified.

On the other hand, really serious bugs must be corrected immediately. Unfortunately, experience has shown that most of the time required to fix a bug is not consumed actually fixing the problem, but debating whether or not a problem exists and who should be involved. In a typical situation, several weeks are spent determining whether the problem can be handled internally, whether the local representative of the vendor can handle the problem or whether the central support people need to be working on it.

The best procedure is to lay out the rules ahead of time. Decide in advance who will be put on the problem and when. For example, one company has set the following guidelines for dealing with serious bugs:

1. If a problem is unresolved for three days, the local representative of the software vendor is involved.
2. If the problem is unresolved for more than a week, the central support people for the software are involved.
3. If the problem is unresolved for more than three weeks, the central support people must remain on-site until the problem is corrected.

This type of arrangement makes sense at any time, but is especially important if:

1. You are one of the first users of a new software package.
2. You are one of the first users of a new module for an existing software package.
3. You are one of the first users of a new version of an existing software package.

It is important to keep in mind that even though a vendor may have delivered eight or 10 copies of a package, you may be the first user to exercise most of its functions. It is common for a company to take delivery of a software package and, for various reasons, not implement the software for some time.

Just as people assume that MRP II software is functionally complete, they also assume the software will interface well with their existing systems — manufacturing systems that are already in place such as inventory transaction systems or bill of material systems as well as financial, labor reporting or marketing systems. Unfortunately, most software packages were not designed with interfacing in mind.

The designers of most software packages assume that a company will use only their software. These designers assume that if a company has any other systems, it will throw them out and replace them with the software vendor's systems.

This assumption makes sense in the small systems marketplace. IBM System/34 or Hewlett-Packard Co. HP

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3000 users typically don't have much in the way of existing systems or data bases going into the implementation of MRP II. These people can and typically do convert completely to their vendor's software.

On the other hand, other companies have a large mainframe supporting many existing applications that are all tied together. In such a situation, replacing all systems with something new is likely to be a trauma unmatched in the history of the company. A more sensible approach would be to choose one of the software packages that are specifically designed for easy interfacing.

Some software vendors have designed their MRP software so that it can interface easily with almost any other system or systems. A single interface program extracts the required information for large batch processing runs like MRP or capacity requirements planning from the existing systems and data bases. This information is loaded to a special data base or set of files for processing. This processing to extract the required information is somewhat inefficient, but the design of these work data bases is such that they are quite efficient for processing large batch jobs.

Software Suppliers

There was a time when you didn't have much choice about what MRP software to use. In 1968 there was one MRP software package: Pics. By 1974 there were 40 vendors, and in 1981 there are more than 100 companies marketing MRP software packages.

Within this group of vendors are some general subdivisions pertaining to factors such as the source of the software, the programming language, the type of computer on which it runs, the data base management system and so on. By the time all these have been considered, there may be only five or so real candidates for a potential user to consider.

The technical characteristics of the system are pretty straightforward: Either it will run on your type of computer or it won't. The software is either written in the programming language you use or it isn't. However, the different sources of software are not as clear-cut. Each of the different types of MRP II software suppliers has its pros and cons.

Basically, MRP II software comes from hardware vendors or software vendors or is "home-grown."

Some people might quarrel with these three groupings, since there are other suppliers like consulting organizations, service bureaus and facilities management companies. However, for our discussion, we will consider consulting organizations that market software as software vendors. Service bureaus and facilities management companies are, in effect, subcontractors. Someone in your organization has subcontracted with these organizations to provide your software. These service bureaus and facilities management companies can then choose any of the three main types of suppliers.

Each of these different sources of software has its own advantages and disadvantages. Depending on the situation, one may be a better choice than another. There is no way to generalize that one or another supplier is better in all cases. Recognize also that for each of the general observations listed below, there is probably an exception.

Hardware Vendors

The hardware vendors, such as IBM, Honeywell, Inc. and Sperry Univac, are generally the most well known. Most of these vendors supply software for their own computers.

The advantages of software from hardware vendors are:

1. You know it will run on the vendor's computer.
2. The same vendor is accountable for both the hardware and software.
3. The price is generally less than with the other sources of software. However, usually more modification is required and so the costs are more nearly the same than it would first appear.

Following are some disadvantages:

1. Hardware vendors are in the business of building and selling computers. Software development and support is not their main business. As a result, many times their software is not as complete as other types of software.
2. There is little incentive to reduce the hardware requirements for the software.
3. The software is often tied to a particular type of computer or data base management system (DBMS). Moving to another computer or DBMS may require significant modification.

Software Vendors

Software vendors generally provide software as their primary product. They may also sell consulting support, training and so on. These other services may or may not be included in the price of the software, but in either case, they are really support services for the primary product, software. The exception to this would be a consulting organization whose primary product may not be software.

Among the advantages of software from software vendors are the following:

1. Software is generally their primary product. They live or die by it and so the software is generally more complete than that from hardware vendors.
2. The vendor has an incentive to reduce the hardware requirements for the software since it expands the vendor's market.
3. Some of this type of software is data base-independent and may run on several different types of computers. More and more software vendors are adopting this approach, as it also expands their market.

As for disadvantages:

1. Software vendors are smaller than hardware vendors and can run out of support capacity if the package becomes quite popular.
2. The price is usually greater than the price of hardware vendor software. However, there is generally less modification required and so the costs are actually more nearly the same than it would first appear.

Home-Grown

The most common situation in which a company develops MRP II software is a commercial venture. The company could be a service bureau, a facilities management company or a consulting organization. The comments below are for manufacturing companies attempting to develop most or all MRP II software for their own use.

The track record for home-grown MRP software is poor, and very few people today even entertain the notion of developing their own MRP II software. One of the reasons is the size of the job.

MRP software packages are big by nearly anyone's standards. Many of the commercially available systems have required more than 50 man-years of effort. If you take a number like 50 man-years and divide it by the number of programmers and systems people, the problem becomes obvious.

Another reason for the poor track record in home-grown software is what has been called the "design-the-tool" syndrome. People spend a tremendous amount of time and energy on designing the tool. As a result, they are still designing when they should have implemented the system and started to get results. People who develop their own software also tend to design a custom system and then proceed to rediscover the mistakes of others.

A third problem with home-grown software is that it tends to be designed around current business conditions. For example, a company may not have distribution centers or branch warehouses today. As a result, the system would be designed without the capability to support distribution centers. Next year, the competition may introduce distribution centers, but the data processing department estimates that the software to support distribution centers will

(Continued on In Depth/22)

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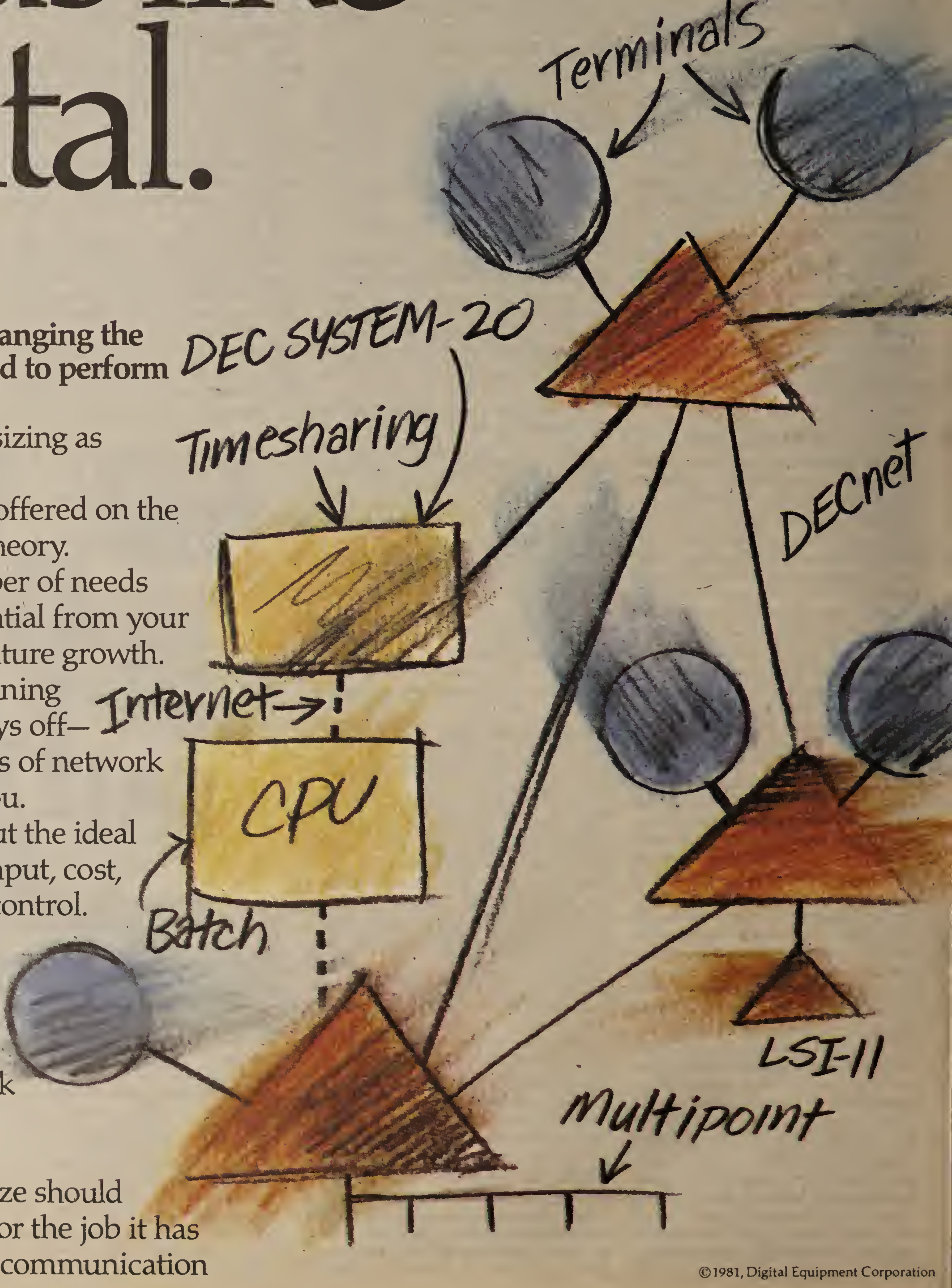

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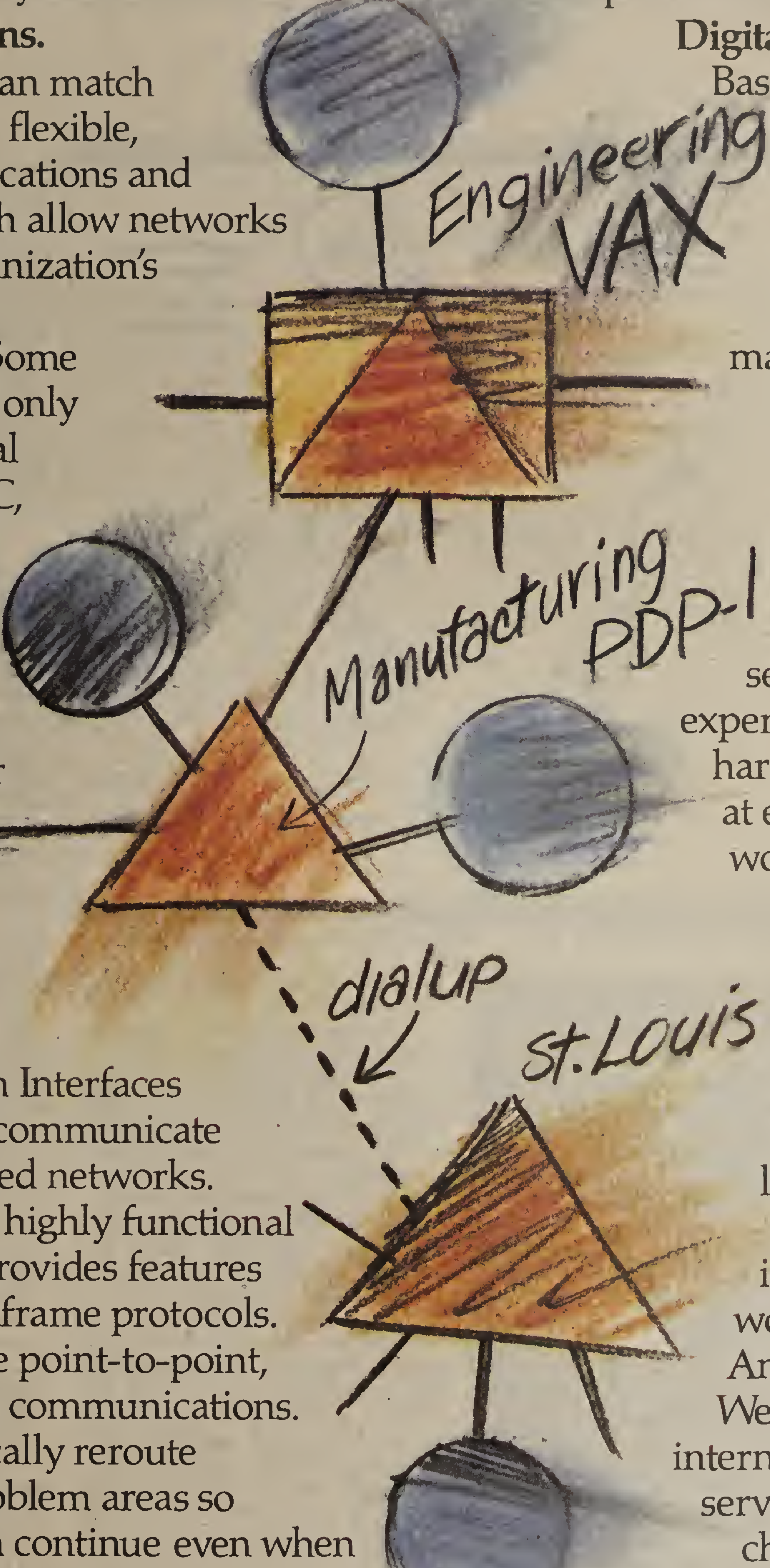

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(Continued from In Depth/19)

take another year to develop.

Neither the customers nor the competitors care very much about the system. Results are what counts. In this situation, the lack of generalized software for MRP II will hurt the business significantly. While the in-house method has worked in a few situations, it is certainly risky at best. For this reason, we list only its disadvantages:

1. The time required to develop the software generally exceeds the implementation time frame.
2. Implementation is stretched out, delaying the payback from MRP.
3. Errors of the past are rediscovered.

Some Perspective

When evaluating different MRP II software packages, it is important to keep the objective in sight and recognize that there are a number of ways to get there. The objective is a successful MRP system, and software is just part of the job.

Many people ask us which is the best software package on the market. Our answer is always the same: Nearly any of the different software packages can be made to work, but some require more modification and frustration than others.

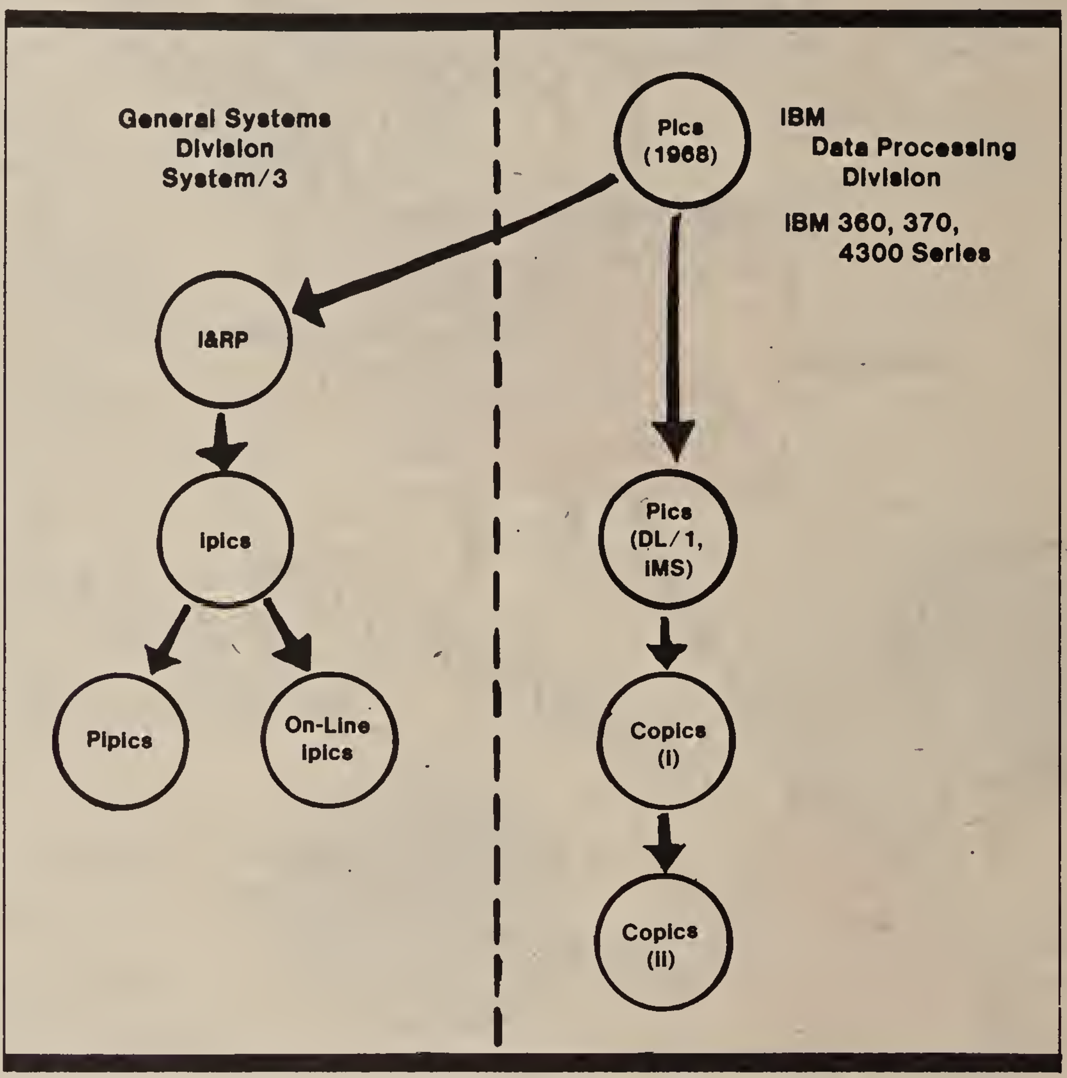

Figure 1. Evolution of MRP Software: Hardware Vendor Software

Companies with really successful MRP II systems are using a wide variety of software. The success or failure of MRP is not likely to be the result of the software. In most situations, if an MRP system is not working well, chances are that the human factors — education, inventory record accuracy, bill of material accuracy or production planning and master production scheduling — are the problem, not the software.

The best illustration of this is the fact that many of the most successful Class A MRP II users are using IBM's Pics package. By any standards, this software is difficult to use, difficult to modify and inefficient from a data processing point of view. Yet these companies are overwhelmingly successful in getting the benefits from MRP II. The reason: They have a system that provides the basic functions of MRP and have done an excellent job of education, inventory accuracy, bill of material accuracy and production planning and master production scheduling.

The software, however, can become critical to the success of MRP II if it begins to affect the human part of the system. For example, if problems with the software cause the implementation schedule to slip significantly, some serious repercussions are likely. One is that the massive education program, which is part of any successful MRP implementation, will begin to lose its effectiveness.

Lack of reinforcement is likely to cause a lot of what was learned to be lost. Another problem is the effect on morale. Implementing MRP II is a large project that requires commitment and effort "above and beyond the call of duty." Significant delays in implementation can deflate morale and kill the extra effort that is so vital to the implementation.

The important thing is to be sensitive to these types of problems. People who are able to see what is likely to happen have a head start on preventing it from actually occurring. Prevention is the name of the game; and a good job of selecting software and then monitoring software progress should prevent these types of problems from occurring.

An Immature Industry

Software is an immature marketplace when compared with many others. That doesn't mean it hasn't been around long, but that the way people approach the purchase of software can be quite immature. Likewise, the development of software can be immature.

Many companies are willing to trade proven performance for the "state of the art." For example, one software vendor introduced and sold many copies of a new package then under development. But the package didn't work once it was released, and it took several years to get it operating successfully. Why did people purchase this package? Mostly because it was "state of the art." In this case, whether consciously or unconsciously, these companies traded this characteristic for a proven record of performance.

That is not to say that there aren't other commodities that are purchased while still in the development process. For example, United, TWA, Eastern and the other major carriers all agree to purchase aircraft that may be in the process of development. However, they also stipulate certain levels of performance the vendor must meet. The same thing should have been done with the software example just discussed, but it wasn't.

Another example of the immaturity of the business is the product development cycle. The maturity of an industry can be measured by its approach to developing a new product.

A product has been immaturely developed if a company develops the product, sells it and then determines market acceptance. In mature product development, a company identifies a new product, actively and formally seeks information from the marketplace on the new product, seeks advice from those people with experience in the product and then develops the product using all the information available.

Immature software development is internally focused; it relies on the views of company personnel alone. Mature software development is both internal and external in a formal way, as it takes into account the customers' and experts' views.

This is not to say that there aren't some places where the internal approach to development does work. It

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makes a great deal of sense where strict secrecy is required, where product development costs are low and where product development times are short. Unfortunately, software development doesn't fit this category.

Nevertheless, in a number of cases, software has been developed using the internal-only approach. In a most extreme case, a vendor developed an MRP software package using people who had never been in a factory. That didn't stop these people from being highly opinionated as to the software's characteristics. Predictably, the software had lots of problems.

Because the software marketplace is somewhat immature, the most informed buyer should insist on some assurance of performance. That assurance could consist of visits to several companies already using the software package without problems, or it could be a written assurance from the vendor on performance, with specifications and penalties. Most well-informed software buyers make it a point to visit at least one user of the software package and to talk by phone with several more references.

The method used to choose these references is important. The ideal references are Class A or Class B MRP companies, because they are exercising most of the system's functions in a standard way. If a reference company doesn't know what Class A or B means, assume they are Class C or below. Companies that are not Class A or B can still be valuable as references, but it should be understood that they may not be using all the functions in the system as they should be used. Consequently, there may be problems in the software that are not apparent to them.

New Software Packages

The number of new software packages has been increasing steadily over the last few years. However, very few software packages are totally new. Most of the new offerings are revised, or in some cases simply repackaged, versions of older software. For example, Copics is derived from Pics for a DL/1 data base, which in turn was derived from Pics using Dbomp. Martin Marietta Corp.'s MAS E is derived from MAS I, and Software International's MRP System 2 is derived from AMS' MMS package for the HP 3000, which is in turn derived from AMS' MMC package for Microdata computers. Figures 1 and 2 illustrate this type of evolution.

This is not to imply that significant changes and/or improvements have not been made as the software progressed from one stage to the next. In many cases, considerable effort has been put into the software. In other situations, the changes have been mostly cosmetic. In any case, the fact that mostly or completely new software packages are not being brought to the market says something about the complexity of the software.

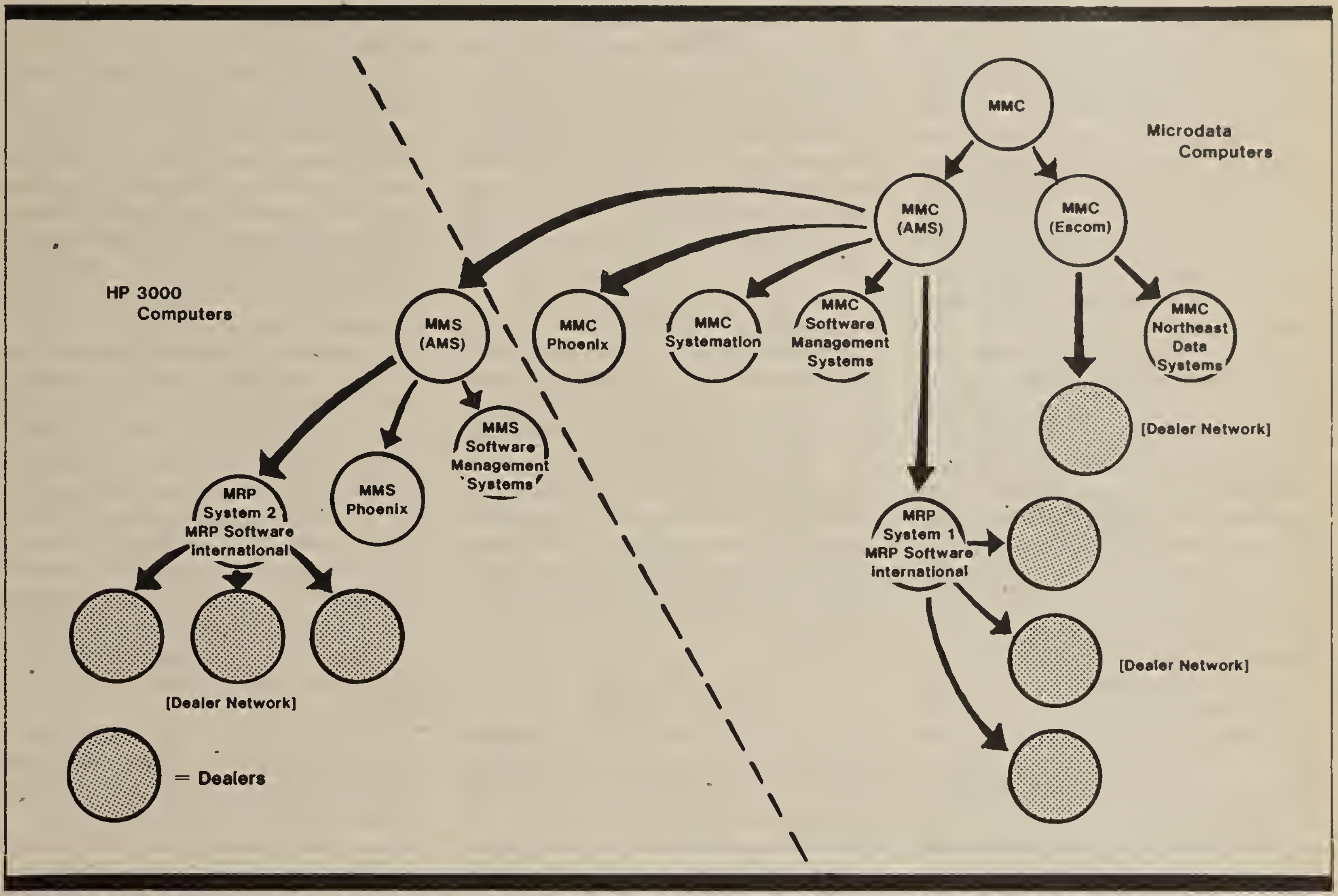

Figure 2. Evolution of Software Vendors' MRP Software

Root of Many Problems

Many of the problems with MRP II software can be traced to the lack of simplicity in the software. Complicated software leads to a number of problems:

* A long learning curve for users.

* A mind-boggling number of options, all of which have to be understood by the users even though all the options will not be used.

* A long installation time, even though an off-the-shelf system can be installed in a day or two.

* A cycle of three to five years for developing a complete MRP II software package.

* Significant expenditures of time and effort in order to modify or interface the software.

* The repackaging and revision of software, instead of the development of new software to take advantage of hardware advances.

* The development of software by data processing people instead of by users.

Basically, there are two types of complexity:

1. Complexity inherent in all software.

2. Complexity built into the software by its designers. Examples of this are unnecessary options or features.

Let's examine each point in detail.

The logic of MRP is simple and straightforward. There are no tricks. Once someone goes through an education program on MRP, he should be able to learn to use a particular software package in a short time. There may be some differences between the sample reports, displays and transactions and the actual software he uses, but they should not require a great deal of time and effort to master.

The problem is that the learning process often does require a great deal of time and effort. Based on our experience, a typical company spends more than six months mastering the operation of a typical MRP II software package. This is primarily because of the mind-boggling number of options and features that are available. In addition, the transactions, reports, displays and documentation are not standardized.

One software vendor once remarked that additional functions and options in a system are an advantage. "It's like equipping a car with more features," he said. But that's not true. Beyond the standard functions required for an MRP II system, any additional functionality is a liability, not an asset.

Additional functions in a system have to be understood by most of the people operating the system, regardless of whether they intend to use the functions or not. Users must understand that the option exists, what will happen if the option is ever used and what to do to correct any problems if the option is ever used by mistake. The process of explaining this will doubtless require a great deal of conversation and may create confusion.

If it takes a month to learn the options and features that a company will use, it will take at least another three months to learn the options it will not use. And if there are more options and features that will not be used than there are ones that will be used (as is the case in most MRP II software packages), then it will take even longer. Consequently, six months or so are required to learn how to use the system.

This is not necessary, nor is it desirable. A well-informed buyer looks for an MRP II software package that is functionally complete, but does not include unnecessary functions or options. The best approach to a software purchase is to become well-educated on what the standard tools are and then get the software that provides those tools with as little additional complication as possible.

Installation Time

The installation time for a typical mainframe software package is usually more than nine months. However, the off-the-shelf version of the software can typically be installed in a few days. Why?

One reason is the problem of interfacing explained above. Most software packages don't lend themselves well to interfacing with other applications. For example, you may already have a bill of material system or an inventory transaction system. These systems work fine, people like them and they understand how to use them. In a situation like this, a good rule to follow is, "If it ain't broke, don't fix it."

However, in this case, you usually have to either replace the system that works or interface it to the rest of the software in a package. Neither alternative is particularly attractive. Replacing a system that works means reeducating all the users. Interfacing the existing system to the new soft

(Continued on In Depth/24)

(Continued from In Depth/23)

Normally, these are the only two alternatives. However, one vendor has an excellent solution to this interfacing problem. Its system has two transaction formats: one that people use and another that is used internally by the computer programs. A program at the front end of the system reads the transactions in the user format and translates them into the internal format.

The net effect is that users can switch from their old system to the new one with a minimum of disruption. The transactions look the same, and they are filled out or entered through the CRT terminals in the same way. The difference is in the programs that process the transactions and the files that are updated. In this situation, there are some small differences between the operation of the old and new systems, but the similarities are great.

If you have a system that people use, like and are well trained on, then it would make sense to look into a system like the one described above.

If the software you are considering does not have this capability, you might consider adding it if the job will not require too much time and effort on your particular system.

Because most software for MRP II is complicated, the development cycle is much longer than it should be. A complete software package may require three to five years. The development of a module like master production scheduling, for example, typically takes more than a year.

This long development time is unfortunate for several reasons. First, it limits the choice of software. Many companies purchase a package that is not entirely complete. For example, the system may include bills of material, inventory transactions, scheduled receipts, material requirements planning and master production scheduling. However, the shop floor control, capacity requirements planning, input output control and purchasing functions may not yet be complete.

Making Choices

What choice should a company make in this situation? Should it go ahead and purchase the software with the understanding that the unfinished modules will be completed by the time it needs them? Or should it eliminate the software package from consideration because of these missing modules?

We generally suggest looking at the modules that are missing and assuming the worst. If the vendor fails to perform, can you adequately develop these modules in-house? Granted, this is not the ideal situation, but if you were backed into a corner and had to do it, would your company be able to handle the systems and programming requirements? If so, then you should go ahead and consider a software package that is missing some of the modules.

It should also be pointed out that a number of companies have completed the systems and programming effort for shop floor control, capacity requirements planning and I/O control. Likewise, a number of companies have been forced into developing their own master scheduling modules. Both jobs required quite a bit of effort, but the job was completed.

On the other hand, few companies have developed the MRP logic as well as the supporting systems like bills of material, inventory transactions and scheduled receipts all at the same time. Some companies have done a single system, like inventory transactions, but few have done all of these systems.

Modification and Interfacing

Complicated software is difficult to modify or interface to other applications. Generally, the actual modifications are not difficult, but it takes time to figure out what to do. It's like open heart surgery. Once the surgeon knows what needs to be done, where the problem is and how the solution will work, the actual cutting takes only a few minutes. Likewise, the time required to make modifications is largely spent figuring out how the software works, what will happen if you change something and how it impacts the other programs and files down the line.

In effect, many modifications require a reasonably complete understanding of the entire software package. It takes a considerable amount of time for a person to become this knowledgeable in a system.

Interfacing can present a similar problem. In its simplest form, it merely involves a transfer of information from one program to another. More typically, however, things don't fit that well because the overall architecture of the two systems is dif-

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ferent. The two designers saw the world somewhat differently.

In such a situation, the interface has to contend with special codes, record types, the sequence in which certain programs are run and so on. There is no question that this interfacing can be done, but the cost in time and money can be larger than expected. For this reason, time and cost estimates for anything other than the simplest interfacing should be viewed with a certain amount of suspicion.

Fewer New Packages

Another disadvantage in software complexity is that fewer software packages are being developed, as was discussed earlier. Most new software packages are really evolutionary developments derived from earlier systems.

This is not a disadvantage from a functional point of view. The fact that software uses the same functional logic is really an advantage, not a problem, because it means the software has been tested and proven over the years.

The problem, however, is in the technical aspects of the software. Systems today are being used and marketed for hardware that didn't even exist when the architecture for the software was developed. For example, a number of software packages have been developed for large mainframes operating in a batch processing environment. Now, hardware is becoming more and more oriented toward on-line processing and display of information. This is a very different environment, and some of the architecture of the software really should be changed to accommodate the shift to on-line systems.

Unfortunately, the development time for a new system designed for on-line hardware is, as we have mentioned, three to five years. Since vendors are scrambling to get their products into the marketplace in a hurry, most are opting to convert their existing software to include some on-line functions. While this is the most expedient route, it is not necessarily the best.

Development Without Users

Manufacturing software is usually not developed by its users because it is so complicated. It almost always has to be developed by data processing experts rather than by experts in manufacturing and distribution. Rarely are people highly knowledgeable in both areas.

A good case could be made that software should be developed and tested by the people who use it. They understand both the problem and the solution. Unfortunately, because these people are left out, the quality and practicality of the software suffers.

What to Do

So much for the problems that come from the overcomplicated state of affairs in software. What can the user do to cope with them?

First, you can insist on simplicity in any software you buy. Steer clear of packages loaded with unnecessary complications and features. Remember that you will have to explain most of them to many different people in the company, and you will have to know how to fix things if the wrong options are used.

Next, determine how much, if any, interfacing will be required. Are you replacing all systems with the new software? Or are you interfacing the new software to a number of existing systems? If you are interfacing, is the software you are considering the type that can interface easily? Look into the history of the software. Was it designed for a large batch processing system, but later adapted to an on-line type of hardware? If so, talk to some users and see if this is creating any problems.

Looking at the big picture for software, there are a number of things you will just not be able to change in the short term. The most serious of these is the complexity of software in general. Programming a computer is like learning five or six foreign languages and being nitpicked to death all the time. You have to learn the programming language, the job control language, the data base management commands and data definition language and finally the language of the communications monitor. And you can't make any mistakes. A program may have more than 1,000 lines of code, and if any one of them is wrong, the program will work incorrectly.

The bottom line is predictable. Programming is a slow, labor-intensive, expensive process. It seems to take forever to do jobs that are simple in the extreme. For example, suppose you want to change the quantity per assembly field in the product struc-

(Continued on In Depth/26)

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(*Continued from In Depth/25*)

ture record from five digits to seven. In a typical MRP system, it will take the better part of two months to identify the changes, make the corrections, reformat the data areas, recompile the programs and test the changes. Someone in manufacturing or top management may have difficulty understanding that estimate. Can you blame him?

Eventually, there will be a breakthrough in software. When it comes, computer users will be able to develop, modify and maintain software simply. Many of today's problems will be eliminated. Unfortunately, if current trends are any indication, it will be some time before this happens. Software seems to be getting more complicated, not less.

As a user, you can't do much about this general problem. It's up to the computer manufacturers to make their machines easy to use. However, there are some principles that you may choose to follow as a result of seeing this big picture:

1. Simplicity is far better than complexity.
2. Time and effort are more valuable than systems resources.

By insisting on simplicity in software, you will be doing two things. In addition to making life a lot easier for yourself and your company, you will be sending a message to the people developing software. If enough users insist on simple, workable software, that's what the developers will produce.

The second point is to assume that systems and programming time is a rare and precious commodity. If there is a trade-off between additional systems and programming effort and more system resources (main storage, disk storage and so on), choose the hardware. Do everything you can to unburden systems and programming people as much as possible.

Some manufacturing companies have taken an original approach. They have made the data base available to users through one of the commercially available report writers. In some cases, these report writers are easy to use when accessing the DBMS directly. In other situations, the use of the report writer with the DBMS is difficult enough that the company has a single program that reads the data base and writes the contents to a work area. Unlike the data base, the work area is easy to access using the report writer.

A number of different users have been trained to use the report writer, and they handle most of the reports that are needed. Now the users of the system who feel the urgency of getting a report are self-sufficient. They are capable of making any changes that are needed. The systems and programming people can spend more time on the other more difficult projects.

An extension of this approach has been used by several companies. Their problem was that the lack of systems and programming people was beginning to hamper their progress. Systems and programming people are hard to find, turnover is frequent and it takes time to educate these people in manufacturing.

These companies departed from the traditional approach. Rather than hiring systems and programming people and teaching them manufacturing, they identified manufacturing people with an aptitude for logic and mathematics. These people are then trained in data processing and given responsibility for maintaining some of the existing manufacturing applications. As users of the systems, these people feel the pain of software that should be corrected or modified.

The responsibility of the DP people in such a situation is to coordinate these users just as if they were in the DP department. Any changes that would affect other programs or files have to be discussed and cleared with the people responsible for those applications. The only real difference between this arrangement and the more traditional one is that the people doing routine maintenance work report to operating managers as opposed to the DP manager. With the difficulties in finding and holding good systems and programming people, it seems only a matter of time before more companies implement this approach.

All this is not to say that there are

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no simple systems. Mitrol, Inc.'s Mims, for example, is a simple English-like language.

People without extensive DP training seem to be able to use the system effectively. These users modify transactions, create reports and displays and update the sizes of the files and fields in the data base — all without requiring experienced systems and programming help.

Considering the number of systems and programming people that will be needed in the next 10 years and the available supply of such people in the work force, something simple like Mims seems to be a good bet.

Trends in MRP II Software

From a technical point of view, users will probably see more of the following in coming years:

1. On-line systems.
2. Data base independence.
3. Different types of hardware.
4. Attention to price as an issue in selecting software.

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SALES REGION	PREVIOUS QUARTER actual	target	%target	CURRENT QUARTER actual	target	%target	NEXT QUARTER
Easter	[illegible]	307	94	222	342	65	391
Souther	[illegible]	159	89	[illegible]	171	69	230
Midwest	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	187
Western	[illegible]	[illegible]	91	[illegible]	[illegible]	[illegible]	370
Europe	[illegible]	231	91	[illegible]	[illegible]	[illegible]	301
Canada	[illegible]	111	68	[illegible]	[illegible]	[illegible]	159
Mexico	[illegible]	[illegible]	95	[illegible]	60	61	81
Japan	[illegible]	92	116	[illegible]	117	81	132
India	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	75
China	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	207
Korea	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	73
TOTAL	1566	1579	99	1178	1834	64	2206

5. Object-code-only systems.

The shift to on-line systems has been swift and strong. In fact, it seems to have caught a number of software vendors off guard. Several years ago, a number of software packages had some on-line features.

IBM had included some on-line features in Pics, and a number of the independent software vendors were introducing some on-line inquiries and, in some cases, on-line data entry for batch updating. The exception to this was software for computers like the HP 3000, which has been pretty much on-line from the beginning. As the result of IBM's releasing Copics for 370-compatible systems and Mapics for the System/34, on-line systems seem to be the rage.

There is no question that on-line systems are desirable. If properly designed, on-line systems can be easier to use and more productive. However, the emphasis on on-line systems seems to be out of proportion with the actual hard dollar benefits that result.

Some Class A MRP II companies have on-line systems, and others do not. Their results are determined by how well they manage the system, not by whether or not they are on-line. Their success hinges largely on education, inventory record accuracy, bill of material accuracy and management of the production plan and master production schedule.

As a rule of thumb, if an on-line system does not exist for your type of computer, don't rush out to invent one. You will be able to make MRP II work just fine without it.

The second trend in MRP II software is data base independence. A number of the earlier software packages were designed for a particular DBMS. It wasn't long before someone realized that if you could make the system run using any of several different DBMS, the market for the package would grow.

The approach toward data base independence only makes sense in the following situations:

1. The software is being designed for a type of hardware for which there are a number of different DBMS (example: IBM 370-compatible computers).

2. The software is being designed for eventual use on a number of different types of hardware that use different DBMS.

Typically, data base independence is achieved through a data base access module. This module is the only part of the software that actually reads or writes to the data base. The application programs call this data base access module whenever it is necessary to read from the data base or write to the data base.

One advantage in this method is in converting from one DBMS to another. Conversion simply requires construction of a new data base access module. It is not necessary to change the application programs.

A disadvantage in data base independence is that the application software should be designed to handle the idiosyncrasies of all the different DBMS. This makes the software more complicated and, in some cases, less efficient.

The idea of data base independence seems to have caught on some years ago when Arista Manufacturing Systems, Inc. and Comserv Corp. released data base-independent software packages. However, at this point, it's hard to say whether the trend to data base independence will continue.

As mentioned earlier, few really new MRP II software packages have actually come to market. Most of the new packages are really revisions to existing software. The completely new packages that have come out recently are not really good test cases for whether data base independence will continue.

One new system is Cincom Systems, Inc.'s MRPS, and another is IBM's Mapics. Cincom markets its own DBMS (Total), so it's not hard to understand why its software is not data base-independent. In the case of Mapics, IBM doesn't concern itself much with interfacing to other people's DBMS. For this reason, there is no real proof that data base independence will continue to be a trend in the industry.

For our part, we hope the trend continues. A company may be using a particular DBMS today, but that is no guarantee they will want to continue using it for long. If a company is locked into a particular DBMS by way of its MRP II software, it becomes harder to replace the software. That, in turn, makes the vendor less responsive since it knows the system is harder to change.

A third trend in software is to make the software available on different types of hardware. For example, Comserv's Amaps is available on a number of different types of systems. On the other hand, a number of packages (IBM's Copics, for example) are available on only one type of computer. In general, independent software vendors (not hardware vendors) have an incentive to make their software available on different types of computers. Some vendors have made this conversion,

(Continued on In Depth/30)

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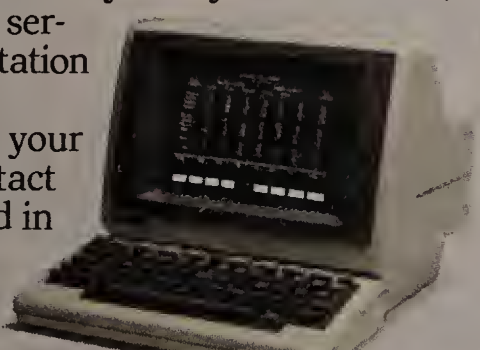

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(Continued from In Depth/29) and others have not. As a software package from an independent software vendor becomes quite popular, it generally becomes available on other types of computers.

The difficulty with this process is that Cobol for one type of computer is not exactly the same as Cobol for another. The same is true for the other programming languages. As a result, software for one type of computer is slightly different from software for another. For this reason, the vendor now has to support several versions of the software.

The job of maintaining different versions of the software for different types of computers is expensive. This means there has to be a certain level of interest in order to justify the conversion and the subsequent maintenance. As a result, only a few packages run on more than four different types of computers, and most systems are restricted to only one type.

What this means is that the more popular your type of computer, the greater selection you will have in the way of software. If you happen to own some obscure brand of computer, you have three choices, none of which are particularly attractive. One is to approach a software vendor and offer to underwrite some or all of the cost to convert its system to your particular type of equipment. Another approach is to get a software package and make the conversion yourself. Both of these approaches have been tried and both will work.

On the other hand, in some situations, it may make more sense to switch computers. This is the third choice. It really all depends on the number of applications that are already running on the computer and which would have to be converted.

Sensitivity Toward Pricing

The fourth trend is an increased sensitivity toward pricing. There was a time several years ago when a software vendor could name its price if its software was functionally complete. That doesn't seem to be the case any more.

A number of companies upset the apple cart on this one, but the most influential was IBM. With MRP II software packages selling for hundreds of thousands of dollars, Copics came out for $35,000, and Mapics can be rented for around $500 per month. The result is a double humped pricing curve, like the back of a camel. There are a number of software packages in the less expensive end of the pricing curve and a number of others at the top end, but few are in between.

A logical conclusion is that the software at the less expensive end is less complete or otherwise deficient in some way. However, ASK Computer Services' Manman, for example, is quite complete but would be considered in the less expensive range. As a result, more and more people are asking whether the software in the expensive range is really worth it.

The thing to do here is to evaluate the software and determine how much work

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modify it. If you can make the necessary modifications and supply any missing modules, go ahead and estimate the cost. Then be sure to apply a fudge factor for software development; it always takes longer than it should and is more expensive. If the result is still significantly cheaper than one of the expensive software packages, it's probably a good deal. However, be sure to talk to someone using the system (preferably someone who has also made the modifications or is in the process of making them).

Object-Code-Only Systems

The fifth trend is toward object-code-only systems. With these systems, the software vendor does not make the source code available. Only the object code is distributed. Examples of this are Materials Management/3000 by HP, a version of Unis 80 by Sperry Univac and Forman by Formation.

One reason for object-code-only distribution is to protect the vendor's investment in the software. Another reason is to simplify support of the system.

If only the object code is available, all users will be using a tested version of the software. They will not be able to make changes to it and, consequently, many of the problems introduced that way will be eliminated.

It should be pointed out that a number of different types of software are object-code-only. Operating systems and some DBMS are examples.

However, application software has typically not been distributed this way because people make the most changes in this area. Very few companies have implemented MRP II software and not made a number of changes to it. As mentioned earlier, these changes typically fall into three major groups: functional modifications to the system, those necessitated by regulatory requirements (lot control or traceability) and changes in field sizes, reports, CRT displays and transactions.

Therefore, any object-only system would have to be functionally very complete and would have to allow users to change field sizes, reports, CRT displays and transactions. It would also have to allow the users to provide additional software to meet regulatory requirements. If any of these things are missing or cannot be provided, problems will be likely.

The issue here is one of accountability. Who is accountable for the software — the vendor or the DP manager and his people?

In the end, the DP manager and his staff are accountable. If the software doesn't work, he must make it work. In a source code distribution of the software, the DP manager and his people modify the system as required to make it work. In an object code distribution of software, the DP manager has in effect subcontracted the software development and maintenance to a third party, the software vendor.

If the DP manager is confident of the software vendor's ability to support the software and provide any changes that are necessary, then he should be free to use object-code-only software. However, if the DP manager feels he cannot depend on the vendor's ability to make any required changes, then it would make sense to choose another software supplier.

Conclusions

In the final analysis, the critical points to keep in mind when looking for MRP II software may be summarized as follows:

1. Nearly any MRP II software package can be made to work (some with more effort than others).
2. Expect some problems with software. You may be pleasantly surprised, but more than likely there will be functional deficiencies, bugs and possibly interfacing problems.
3. Insist on simplicity. Then go back and insist on it again.
4. Do everything possible to reduce the burden on systems and programming people.

About the Authors

Christopher Gray is vice-president of Manufacturing Software Systems (MSS), a Williston, Vt., firm specializing in publishing evaluations of MRP software.

Before joining MSS, he held a number of positions, including consultant and manufacturing systems instructor with a major software vendor. He holds a master's degree in mathematics from Carnegie-Mellon University.

Darryl Landvater is president of Oliver Wight Video Productions, president of MSS and also an independent MRP consultant. MSS is a joint venture by Oliver Wight and Landvater (see last week's In Depth article on MRP II by Oliver Wight).

Landvater holds a B.S. in engineering physics from Cornell University and is a past teacher trainer in the Peace Corps.

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- How to Select Your Own Micro
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- Inventors in Blue Jeans Fuel The Computer Revolution

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This week, *"Computerworld's"* Len Lawrence starts an interesting five-part series on how to go about selecting the microcomputer that's right for you. Paul Reece, meanwhile, is taking a look at the latest "brain drain." U.S. companies, hard up for programmers and systems analysts, are luring computer professionals from the economically depressed United Kingdom. Plus we'll do a brief portrait of a new kind of revolutionary — the blue-jeaned entrepreneurs and inventors who are making the computer revolution happen.

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Not Meeting User Needs

Tenkhoff: Communications Immature

By Bruce Hoard
CW Staff

OLYMPIA, Wash. — "I'm not sure what we're doing, but I know it isn't right" is an all-too-common complaint from data communications users, according to Dr. Phillip A. Tenkhoff, president of Network Communications International.

Interviewed at his office here recently, the data communications consultant sketched a picture of an immature high-technology industry still unable to fulfill the needs of its users. Relaxed in a woolen shirt — Tenkhoff and his two partners traded the Los Angeles rat race for the Pacific Northwest's laid back life — he described several industry problems, including lack of qualified personnel and its effects.

"Going into the '80s, data communications is where DP was going into the '70s," he commented. That translates into not enough specialists and too much demand. "There is a major emphasis on the desire to get the communications world planned and integrated into the DP world," he added.

One obstacle is the inability of the "half-dozen" major communications suppliers to deliver solutions to users. That is a result of the shortage of data communications specialists; there just are not enough experts to fill the communications demand, he stated.

Tenkhoff was hesitant to blame colleges for the low professional output, saying some do an excellent job of developing people. However, he did chide the schools for tending to be "theoretical" when they should be "pragmatic."

Tenkhoff described a recent situation where he called one of the major data communications suppliers to help set up a network for a company that does more than $1 billion in sales annually. No one returned his call. He called again, and again he received no response.

"This company spends $20 million a year on data communications," he said. Why would

(Continued on Page 58)

A Few Suggestions

OLYMPIA, Wash. — Dr. Phillip A. Tenkhoff suggested a few rules when considering data communications services:

- First, analyze your needs. For example, an airlines reservation system needs "high liability" or real-time response. Contrarily, "financial consolidation for a company isn't like that," Tenkhoff noted.
- Secondly, find out the available options. People can do that by talking with a consultant or making vendor contacts, he said.
- Next, understand what you have now.
- Lastly, find out the current costs. "Some firms can't cut costs because they don't know what their costs are," he said.

Users Knock NCR Comten Support

By Bruce Hoard
CW Staff

SEATTLE — NCR Comten, Inc. has some very serious problems with its field support if you ask its users.

How bad? Ten out of 12 users polled during an informal *Computerworld* survey here at the recent Comten Users Exchange (CUE) meeting agreed NCR Comten field support is lacking. They were asked what they liked and disliked about NCR Comten/user relations.

On the bright side, almost everybody contacted agreed the St. Paul, Minn.-based communications company has a good attitude toward its users and is receptive and responsive to them.

"I think their weakest area is field support," Robert A. Fisher, CUE secretary and manager of communications at Informatics, Inc., said. "Their base of software expertise seems to be restricted to St. Paul." As a result, users find they must count on themselves or other users for troubleshooting, he added.

"Their big problem has still got to be software support — by far," Michael Mower, communications specialist with the Utah State Information Systems Center, said. How does he deal with the problem? "For lack of satisfaction elsewhere, we deal with St. Paul."

Frank Gemma, director of software development at McGraw-Hill, Inc., cited a lack of technical expertise in NCR Comten's marketing staff and blamed it for preventing users from knowing more about products. By comparison, "IBM flaunts what they have," Gemma observed.

"Sometimes they need people who are more technical and not so much marketing," agreed Warren Eder, supervisor of communications software for the U.S. Senate. "Sometimes I can't get the specific answers I need."

"Unfortunately, their support is usually not up to par," commented Charles Luddington, teleprocessing analyst for Hughes Aircraft Co. In his

(Continued on Page 58)

DEC Expands VT100 Series By Adding Three Terminals

MAYNARD, Mass. — Digital Equipment Corp. has announced three additions to its VT100 series of CRT terminals, all designed to meet a range of user needs from lower priced terminals to a fully optioned block mode terminal.

The VT101 is an entry-level CRT terminal featuring local echo for use with computer systems that have no ability to echo back a character from the host system, the company said.

The VT102 offers the functions of the VT101 plus a video option and printer port as standard features. The advanced video option provides users with 24 lines of 132-column display, four character attributes and provisions for user-installable character sets. The terminal has half- and full-duplex communications capabilities.

The VT131 has additional features for use with computer systems employing asynchronous block mode transmission as well as all the features of the VT102 plus local editing capabilities and the block mode feature.

The VT101 is priced at $2,150, the VT102 at $2,400 and the VT131 at $2,450 from Digital Equipment Corp., 129 Parker St., Maynard, Mass. 01754.

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DCA Adds MSF To System 105

NORCROSS, Ga. — Digital Communications Associates, Inc. has added a Modem-Sharing Feature (MSF) to its System 105 statistical multiplexer meant to cut the number of modems needed for a multidrop application.

The MSF is said to permit multiple System 105 units to share a single multidrop trunk-link modem. The System 105 is typically used as a slave unit to a System 355 Master Network Processor or a System 205 Unibus-Interface Statistical Multiplexer.

A basic four-port maximum System 105 costs $1,295, while an eight-port maximum unit costs $1,495 from the firm at 303 Research Drive/Atlanta, Norcross, Ga. 30092.

CRT Unit Gets More Features

MINNEAPOLIS — The Teleray Division of Research, Inc. has added 10 features to its 132-col Model 100 CRT terminal, making it compatible with the Digital Equipment Corp. VT132 and 100 terminals with no price increase.

New features include block mode and full editing as well as half-duplex communications, forms transmit, protect mode and the ability to execute or transmit user programmable functions when on-line, the vendor said.

The Model 100 is priced at about $1,750 from Research, Inc., P.O. Box 24064, Minneapolis, Minn. 55424.

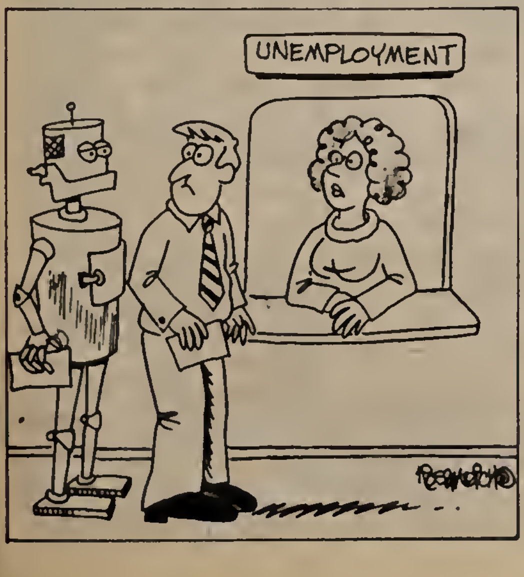
Modem Bows For Apple Units

TARZANA, Calif. — Novation, Inc. has announced a Modem for Apple Computer, Inc.'s Apple II and Apple II Plus processors that employs large-scale integration and can support eight transmission rates up to 1,200 bit/sec.

Called the Apple-Cat II, the modem features software recorded on a floppy diskette and a selectable menu of 19 functions, the vendor said.

The unit can operate at either 50- or 75 bit/sec for low-speed communications, 110- or 150 bit/sec for teletypewriters or 300-, 600- or 1,200 bit/sec for standard dial-up lines, the vendor said.

The Apple-Cat II costs $389, the vendor said from 18664 Oxnard St., Tarzana, Calif. 91356.



Intercon Offers Data Link Tool For IBM, DEC

HUNTSVILLE, Ala. — Intercon Research Corp. has announced a synchronous communications link between Digital Equipment Corp. VAX-11s, PDP-11s under RSX-11M or microcomputers under CP/M and Control Data Corp. or IBM host mainframes.

Operating via either dedicated or dial-up lines at rates up to 9,600 bit/sec, the Intercon 100 Intelligent Interface is a microprocessor-based stand-alone device with self-contained protocols and asynchronous/synchronous data conversion, the vendor said.

Software handlers are available for use with VMS, RSX-11M or CP/M, reportedly providing easy installation without changes to the operating system.

Ascii, BCD

The Intercon 100 with CDC 200UT protocol allows communications in either Ascii or BCD with CDC Corp. mainframes running Scope-Intercom, NOS or NOS-BE, the vendor said.

With 3780 or 2780 protocol, one can communicate with many mainframes, terminals or emulators using either Ascii or Ebcdic, the vendor said.

The Intercon 100 with one protocol costs $3,995; additional protocols, up to four, cost $1,000 each from the firm at Suite 14, 2603 Artie St. S.W., Huntsville, Ala. 35805.

LS-100 Links Graphics Parts

WORCESTER, Mass. — An intelligent modem designed to interconnect IBM control units used in IBM 3250 graphics display systems has been announced by Artel Communications Corp.

The LS-100 connects the graphics system components over distances up to 5 km, replacing customer-supplied coaxial cable between the control units.

The modem transmits in transparent half-duplex mode and built-in remote loopback testing allows full link diagnostics from either modem end.

The LS-100 modem costs $1,200 from the vendor at P.O. Box 100, West Side Station, Worcester, Mass. 01602.

'Synch' Emulates BSC Workstations

NORWALK, Conn. — Westico, Inc. is offering an IBM 2780/3780 binary synchronous communications (BSC) software communications package for the Radio Shack, Corp. TRS-80 Model II microcomputer.

Synch emulates 2770-, 2780- and 3780-type BSC workstations at data rates up to 9,600 bit/sec, the vendor said.

The software costs $500 from Westico at 25 Van Zant St., Norwalk, Conn. 06855.

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NCR Comten Field Service Knocked by Users

(Continued from Page 55)

opinion, NCR Comten field engineers lack a "total concept" of networks while understanding specific pieces of hardware.

One user who wished to remain anonymous said the company "doesn't have the local support people feel they should have." Like others, he said he deals directly with St. Paul whenever possible.

Asked what he did not like about NCR Comten/user relations, Jerry Slavec, project manager of communications for United Banks Service Co. replied, "I think, the lack of commitment for real support in the field, especially with their software."

But Slavec, like the other users, had nice things to say as well. "I like the way they seem to have a receptive attitude to new ideas and they're good at breaking with the conventional." He contrasted the firm to IBM, saying that company is "rigid" when it comes to dealing with network environments.

"They seem to be very responsive on their new product lines," Luddington said. "Their sales staff is usually very responsive also."

"Their marketing people are very attentive and have nice personalities," Edner stated. "They are a good group with a genuine interest in users."

"I would say Comten is a very professional organization in terms of communications," Gemma declared. He was especially pleased with the way NCR Comten provides software for easy migration. By comparison, other companies may pull for "turnkey cutover" on users, making migration difficult or impossible, he said.

Mower was impressed with the sales staff's willingness to tackle problems, even if they cannot solve them. He pointed out that he is located in Salt Lake City, Utah, and the nearest NCR Comten office is in Denver. Despite the distance, staff members are always willing to take a plane ride to try to help, he said.

CUE secretary Fisher had perhaps the most lavish praise of all. "I think they are very receptive in general," he explained. "And I think CUE is a forum blessed by Don Herman [president of NCR Comten]."

Continuing, he said, "In many cases, the company's most significant offerings are derived from specific customer needs. In many cases, the customer base is actually driving the product line and I think that's a very good approach."

Schizophrenia, anybody?

DP Industry Seen Immature

(Continued from Page 55)

a major supplier be indifferent to such a large contract? "I don't know."

Small data communications users have a "low level" of knowledge about what options are available to them, he said, another reflection on how the lack of people has a long-term and undesirable trickle effect on the industry.

Even large users may be in the dark about the best communications solution for their companies, he said. Recently Tenkhoff found himself talking to the data communications manager at one large company about value added services. After a few minutes, the manager stopped him and asked what value added services were.

Sometimes, Tenkhoff said, companies give voice experts responsibility for data. The end result is that somebody who understands voice-related questions about private branch exchanges (PBX) and switchboards is put in an important position where he has little practical experience. Caught up by the "flashiness" of data communications technology, suppliers and users frequently misapply it, he said. A bank might still use a telex to transfer funds. Or another company might use an expensive data link to send data, which could just as well wait a few days and be transferred in an airplane.

"The industry has an awareness problem," Tenkhoff declared. "An awareness problem of what one can really do."

Bell's Packet Net

Asked to evaluate the impact of AT&T's recent announcement of its intent to create a public packet-switching network to compete with Telenet and Tymnet, Tenkhoff predicted that Bell will have to suffer considerable growing pains.

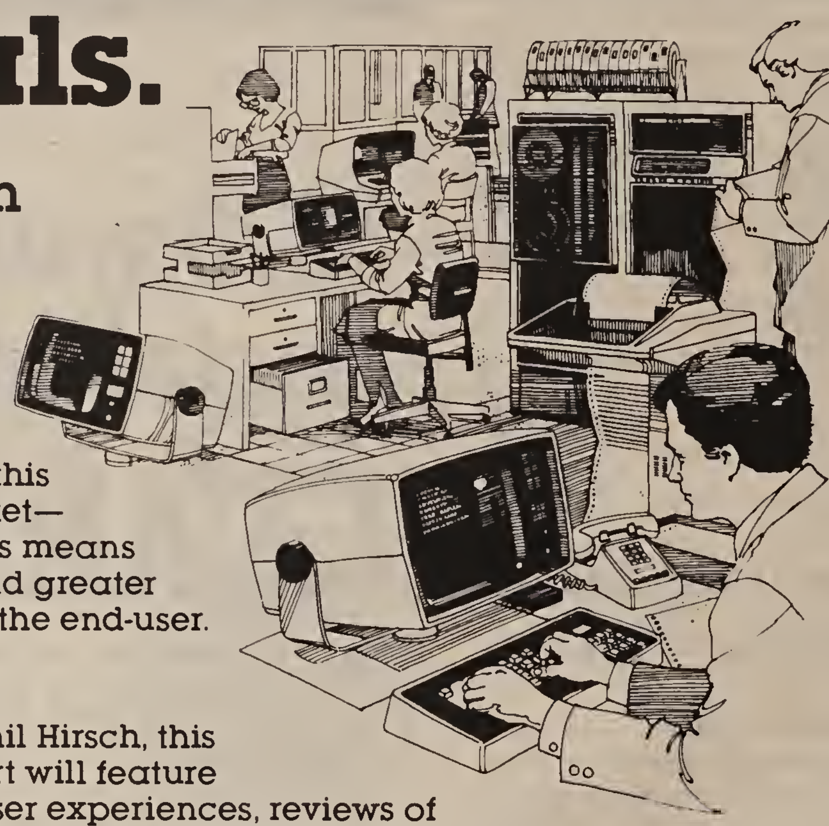
Price and service are the two major criteria that will determine how a Bell packet-switched network fits in, he stated. Reliability will also be very important, he added, saying the reliability of the voice/telephone system has led people to expect consistent quality in their service.

Support will be another problem Bell will have to overcome, the company president said. And supporting a packet switching network will be a "major challenge" to the telephone company because it will have to compete with all the rest of the data communications industry for the few qualified and available personnel.

He predicted it will be five years before the Bell system is up, running and competitive with Tymnet and Telenet.

Data Communications Terminals.

A Special Report in Computerworld on October 26th.



It's not easy keeping up with this ever-changing terminal market—more intelligence in terminals means a wider range of functions and greater flexibility of applications for the end-user.

Edited by Bruce Hoard and Phil Hirsch, this **Computerworld** Special Report will feature tutorial essays, accounts of user experiences, reviews of current products and speculations about the future. And we'll be giving you the most current information about important subjects such as:

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- What the guidelines are for evaluating terminal equipment.
- What's happening with automatic teller machines.
- How to configure networks for multiple applications.

If staying abreast of this rapidly changing field is important to your job, don't miss our October 26th Special Report. And if you're a manufacturer or marketer of data communications terminals or systems, your ad here will reach more than half a million readers (including 114,408 paid subscribers ABC 6/30/81). Ad close is October 9th. Call your **Computerworld** representative for all the details. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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STC Introduces Disk Subsystems For IBM Units

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has introduced the 4305-Model 3, a solid-state disk storage subsystem. The firm also announced a 50% price cut on its high-speed transfer feature on its Model 6 disk subsystem.

Both disk subsystems are hardware and software compatible for virtual storage paging on IBM 370, 30 series, 4300, 3081 and equivalent processors. Both employ 16K-bit MOS random-access memory circuits for data storage, the vendor said.

The 4305-Model 3 emulates IBM's 2305 fixed-head disk at the subsystem level, STC said. Its Model 3 offers 11.25M- or 22.5M bytes of semiconductor storage with a single controller with access speeds of .6 msec and initial data transfer rates of 1M- and 1.5M byte/sec, according to an STC spokesman.

The unit, which can be field-upgraded, costs between $84,000 to $141,160 and leases between $3,051 to $5,078 per month on a 36-month plan.

The Model 6 offers transfer rates of 1M- to 1.5M byte/sec with an optional 3M-byte transfer rate in a 2M-byte wide or data streaming mode. It costs between $140,380 to $489,940 and leases from $4,017 to $14,789 a month on a 36-month agreement. The high-speed transfer feature costs between $16,328 and $43,825. The feature used to cost between $32,655 and $87,045, STC said from 2270 S. 88th St., Louisville, Colo. 80027.

Boat Firm Changes Tack, Sails to Compatible CPU

HIGH POINT, N.C. — Needing more processing power and being unable to get it can knock the wind out of a firm's sails. But a boat building firm here solved that problem by switching from an IBM system to one manufactured by a plug-compatible mainframer.

AMF Marine Data Center, the processing arm of AMF Industries, Inc.'s yacht division, was using an IBM 370/135 when, as DP manager Bob East put it, it "ran out of gas." AMF thought about upgrading to a larger 370/148, but decided the maintenance costs for the system were too high.

As an alternative, the firm turned to IBM's then newly announced 4331-2. The processor met the firm's performance needs, but IBM could not deliver it for seven months. AMF needed the extra power immediately, which put it in a bind, East recalled.

Interim Processor

AMF then called Magnuson Computer Systems, Inc. and bought one of its M80/3 processors. That processor was an interim CPU, however, while AMF was awaiting a larger M80/31, which was delivered about 60 days later.

"The upgrade took about 10 minutes. A Magnuson service representative simply changed a CPU circuit board, added channels and loaded a different set of microcode," East said.

The processor handles AMF's financial data, plus inventory control and labor distribution for three AMF pleasure craft divisions — Hatteras Yacht, Alcort Sailboats and Powerboat Cruisers. The 1M-byte three-channel processor operates with Memorex Corp.'s 3330-type disk drives (600M bytes of single-density storage and 800M bytes of double-density storage) and Memorex Model 8 tape drives. The processor runs IBM's CICS, DOS/VS operating system and Cincom Systems, Inc.'s Total data base management system.

AMF plans to upgrade the system to 2M bytes of main memory and switch to IBM's DOS/VSE operating system in the next few weeks.

Asked what other options he considered when AMF found out IBM's 4331-2 could not be delivered for seven months, East said he looked at IBM's 4341-1 processor as an alternative. That processor more than met AMF's processing needs, and AMF could get an acceptable delivery date, but East said he could not justify the added machine's cost.

"We ran our material requirements planning job streams on the M80 and the 135. It took seven hours on the IBM system and four hours on the Magnuson. That sold everyone," East said.

In addition, the Magnuson processor allowed AMF to bring up CICS, something it had not been able to do with the 370/135.

"The CICS response time for the multipartition environment improved from six to two seconds. Average CPU utilization improved from 82% to 35%, depending on the job," according to East.

Main Concern

One of the big concerns East had with Magnuson was service. Since High Point is "not a metropolitan area," East said he worried it would take too long to service the processor.

"Maximum uptime is one of my main concerns. We're running a billion-plus bytes in our data base and are in operation 20 hours a day. With this kind of load and CICS we need all the reliability we can get," East said.

But so far service has not been a problem. The system has been installed for two years and has only been down once. At that time, Magnuson was able to repair the processor in a little less than three hours. The nearest Magnuson service representative is in Raleigh, N.C., East said.

Stand-Alone Unit

IMI-500 Allows 3-D Viewing

ST. LAKE VILLAGE, Calif. — Interactive Machines, Inc. has announced the IMI-500, a graphics processing and display system that is capable of refreshing 32,000 short vectors at 40 frame/sec, allowing real-time 3-D viewing of complex objects.

The unit can be used as a stand-alone unit or in conjunction with a superminicomputer such as a Digital Equipment Corp. VAX-11. Performance features include virtually unlimited variation of perspective, clip and zoom capabilities. The unit can accept 24-bit floating-point numbers in the data input stream.

The display processor passes the floating point numbers to a pipeline processor, which converts the data to an integer format after the display algorithms have been computed. A stand-alone system with the CP/M operating system and a graphics editor with Assembly language or Fortran callable routines costs $55,500, the vendor said from 2500B Townsgate Road, Westlake Village, Calif. 91361.

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Bits & Pieces

Remote Batch Unit Boasts Switch-Selectable Protocol

STAMFORD, Conn. — Digital Associates Corp. has announced a remote batch printer, a multiprotocol device that gives remote batch users a switch-selectable protocol capability.

In a single protocol configuration, the unit can be used on either dial-up or dedicated lines. In multiprotocol configurations, users can switch the unit from host to host, from protocol to protocol and from synchronous to asynchronous communication.

Supported protocols include IBM Hasp, 2780, 3780, 3270 series and Systems Network Architecture (SNA) as well as Univac Corp., Honeywell, Inc., Burroughs Corp. and Mohawk Data Systems, Inc. protocols, the vendor said.

The printers cost between $5,200 and $20,000 depending on print speed, the vendor said from 1039 E. Main St., Stamford, Conn. 06902.

Interactive Terminal Bows For Xerox 9700 Printers

BOSTON — An interactive terminal for interfacing with the Xerox Corp. 9700 printer, said to allow forms to be created in "a fraction" of the time required by batch coding methods, has been announced by Camex, Inc.

Proformer reportedly allows the operator to position rulework and copy with an electronic pen, selecting sizes, fonts and other modes of operation by touching English commands on the electronic tablet. Old forms that need updating can be recalled from a disk library.

The Proformer system costs $91,000 from the firm at 210 Lincoln St., Boston, Mass. 02111.

Parallel I/O Interface Gives Bidirectional Transmission

SUNNYVALE, Calif. — California Computer Systems, Inc. has announced the CCS Model 2720, a four-port parallel I/O interface that allows bidirectional parallel data transmission to a fourth peripheral.

Data is transferred at transistor-transistor logic levels on separate eight bit I/O addresses where the base is a multiple of four.

The 2720 includes circuitry for 2K bytes of general-purpose random-access memory and a user-supplied 2716 erasable programmable read-only memory can be added to store driver routines and other software, the vendor said.

The Model 2720 costs $250, the vendor said from 250 Caribbean Drive, Sunnyvale, Calif. 94086.

Printing System Handles Control Tags, Labels

DAYTON, Ohio — Monarch Marking Systems, Inc. has announced the Model 2040 Retail Printing System, a controlled tag and label printing system.

The stand-alone printing unit consists of a CRT terminal, a primary printer and up to six auxiliary printers. Printers are microprocessor controlled, the vendor said.

A basic system costs $11,200 and an auxiliary printer costs $9,700. An optional stacking unit costs $900. The vendor can be reached through P.O. Box 608, Department 2040, Dayton, Ohio 45401.

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Checking Out a Problem in the Flight Control Room at Federal Express' Memphis Headquarters

Micros Help Federal Express Deliver the Goods on Time

Special to CW

MEMPHIS, Tenn. — Unlike a lot of companies, Federal Express Corp. lives for tomorrow.

Since its beginning in 1971, Federal Express has built its business on the guarantee that it can take a package or letter and deliver it from here to there in less than 24 hours. But what do you do when you have more than 90,000 small packages to deliver the next day to people in 13,500 communities throughout the U.S.?

Hello, computers!

Since late last year, Federal Express has been using two microcomputer-based routing and scheduling systems to keep track of the thousands of small packages and parcels that are shipped out to various parts of the country from the firm's headquarters here.

The systems — which are wrapped around two Cromemco, Inc. Z-2H hard-disk microcomputers — monitor and control about 60 flights that depart from here each night, make sure the right packages are on the right airplanes and verify that their arrival will be on time.

Six Multiplexers

In addition to the two microcomputers, the system includes six multiplexers that drive 37 interactive input stations and 21 printing terminals located at key points through the firm's headquarters and nine display-only stations that drive 101 video monitors.

While the system presently handles nearly 100,000 packages each night, the microcomputer systems are geared to juggle more than 400,000 next-day deliveries, according to a company spokesman.

Before the computer-based system was installed, Federal Express relied on telephones and written messages to handle its "prelaunch" activities at the Memphis control center. At that time, the company averaged about 40 flights per night from its facility. As the company added more planes and scheduled more deliveries, it soon became obvious that some sort of an automated system was needed to monitor the increased shipping load.

Soon after submitting a proposal request for the computerized system, Federal Express was contacted by Market Data Systems, Inc., a relatively new computer firm that specialized in building data communications systems for agribusiness and other industries.

Market Data Systems' proposal for bringing Federal Express out of the telephone and pencil and paper era reportedly won out over several other proposals from much larger computer vendors. Soon after, Market Data Systems, a Cromemco

(Continued on Page 62)

DG Hikes On-Call Fees

WESTBORO, Mass. — Data General Corp. increased on-call maintenance services by 8%, effective Oct. 1, the firm's field engineering division said.

On-call maintenance, which includes remedial and preventative maintenance, was last increased in April 1980, the firm said. Other firms such as IBM have announced repeated maintenance increases over the past two years. Analysts say the increases tend to reflect increased costs for maintenance personnel.

In a related announcement, Data General said it is opening product repair and distribution centers in Colorado Springs, Colo., and Milford, Mass.

The firm is headquartered on Rt. 9 in Westboro, Mass. 01581.

Formation Beefs Up 32-Bit Line

MOUNT LAUREL, N.J. — Formation, Inc. has beefed up its line of 32-bit minicomputers with the F/4000 Model 300, an IBM-compatible processor that offers redundant modules to reportedly increase reliability.

The processor features up to 8M bytes of main memory and up to 2.4G bytes of disk storage using IBM look-alike 3330, 3340 or 3350 disk drives, Formation said.

The Model 300 provides dual-system control processors, dual-memory control units and dual-electronic modules. A second memory unit is available to achieve the 8M-byte main memory storage capacity, the vendor said.

CPU, Disk Controller

Each electronic module can function as both a CPU and a disk controller. Disk drives attach to the disk controller in each module while the CPU in one module can be designated as an attached processor. This, the vendor claimed, can increase performance up to 60%.

In addition, if the main CPU went down, the secondary processor could operate the system in a degraded mode, the vendor said. A basic system costs $85,500 and memory costs from $3,000 for a 256K-byte increment to $12,000 for a 1M-byte increment.

The Model 300 is available for immediate delivery, as are upgrades from the older Models 100 and 200. The firm also announced a bisynchronous communications adapter, a byte multiplexer and a 125 in./sec 1,600 bit/in. tape drive.

The firm is located at 823 Eastgate Drive, Mount Laurel, N.J. 08054.

Micro-Plus Introduced

RICHARDSON, Texas — Centurion Computer Corp. has announced the Micro-Plus, a small business system that features 64K bytes of main memory, a CRT terminal and two 616K-byte disk drives.

The system can be configured with two optional 1.2M-byte flexible disk drives for a total of 2.4M bytes of disk storage. In addition, two more flexible disks, a CRT terminal and another printer can be added to a basic system to support 8M-byte or 24M-byte Winchester disk drives, the vendor said.

The system uses the firm's Business Management System software. The package is compatible with software on larger Centurion processors.

Systems cost about $11,500, the vendor said from 1780 Jay Ell Drive, Richardson, Texas 75081.

Monroe Introduces Micros

NEW YORK — Monroe Systems for Business, a division of Litton Industries, Inc., has introduced three microcomputers — two for business users and one for education users. Labeled "occupational computers," Monroe's Models OC8810 and OC8820 are Z80-based machines with 128K bytes of memory storage and 48K bytes of random-access memory.

Primarly designed for small business and accounting, the OC8810 is priced at $3,785 with one disk drive, and the dual-drive OC8820 is priced at $4,385. The machines will run the Monroe Operating System (MOS) and feature multitasking as well as Basic and Isam, the company noted.

Initial software packages will include accounts receivable, accounts payable and general ledger that will function standalone or integrated with each other, according to Monroe.

Upgraded versions of Wordstar, Datastar, Infostar and Supercalc are also being offered for the systems. The CP/M and Pascal software packages will be available as well, the company said.

The OC8810/20 has a 93-key typewriter keyboard with a 15-key numeric pad, five-key cursor control cluster, six editing keys and eight programmable functions keys. It also contains three RS-232 serial ports with programmable transmission rates and protocols for communications.

Optional Equipment

Optional equipment includes a choice of three printers, 80- and 132 col dot matrix models and a 132-col formed character model as well as a modem and an acoustic coupler.

The company said that it will soon make a cluster controller available to allow the systems

(Continued on Page 62)

Intel Cards Fit DEC Units

SUNNYVALE, Calif. — Intel Corp. has announced 256K-byte and 512K-byte add-in memory cards for Digital Equipment Corp. VAX 11/780 and PDP-11/70 processors.

The MU-5750-256 and MU-5750-512 are reportedly direct substitutes for their DEC counterparts. However, the 512K-byte version reportedly offers higher reliability with mean time between failures 1.5 to 2 times longer than 256K-byte equivalents, the vendor said.

The 256K-byte board costs $1,500 and the 512K-byte board costs $2,315. Intel is at 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

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Mini Bits

Punched Card Reader Offered for System/34

FRAZER, Pa. — Cardmation Co. has announced the CR300/34, an 80-col punched card reader for IBM's System/34.

The unit can be used with any System/34 with bisynchronous communications capabilities. The tabletop unit includes a card transport, read head, electronics and a System/34 interface. An RPG software handler is also provided, the vendor said.

The card reader costs $8,000. It is also available on a three-year lease for $323/mo or for $232/mo on a five-year lease. The vendor can be reached through P.O. Box 746, Frazer, Pa. 19355

Micro Controller Designed For DEC RX02 Floppy Disk

IRVINE, Calif. — Micro Technology, Inc. has announced the MXV22M, a floppy disk controller compatible with Digital Equipment Corp.'s RX02 8-in. floppy disk.

Available for DEC's LSI-11, 11/2 and 11/23 systems, the disk unit plugs directly into the host backplane via a 32 conductor ribbon to a Tandon Magnetic Corp. 96 TPI double-sided 5¼-in. mini floppy disk or the Shugart Associates, Inc. Model SA 460 disk, the vendor said.

Features include a four-level device interrupt priority, IBM 3740 formatting, concurrent operation with an 8-in. floppy disk and power fail protection, the vendor said.

The unit costs from $1,260, the vendor said from Suite 230, 2192 Martin, Irvine, Calif. 92715.

Heurikon Announces Z80-Based Microcomputer

MADISON, Wis. — Heurikon Corp. has announced a single-board Z80A-based microcomputer, the MLZ-92A.

The processor features a Z80 instruction set and vectored interrupt capabilities. An optional arithmetic processing unit is also available to provide 43 microprogrammed macro commands.

The processor has two read-only memory sockets that accommodate Intel 2716-, 2732- or 2764-type erasable programmable read-only memories and 64K bytes of direct read-only memory, the vendor said. The processors cost $2,789 for a 64K-byte unit, the vendor said from 3001 Latham Drive, Madison, Wis. 53713.

Multiplus Display Tracks I/O, Memory Problems

SPRING VALLEY, N.Y. — Lecroy Research Systems Corp. has announced the Model 1506 multibus display, a plug-in board designed to pinpoint I/O and memory problems for applications programmers.

Units cost $495 from 700 S. Main St., Spring Valley, N.Y. 10977.

Monroe Gets 3 Micros

(Continued from Page 61)

to interface host-to-host or host-to-mainframe while enabling them to share a common printer.

The EC8800 educational computer is geared for secondary and post-secondary educational institutions, Monroe said.

It features high- and low-resolution graphics and text, multiuser/multitasking and multimonitoring capabilities and programmable four-channel sound in addition to the features of the OC8810/20 models. The EC8800 will cost $3,595, Monroe said.

Optional equipment for the EC8800 will include a 14-in. RGB monitor, graphics tablet, a voice digitizer and a music synthesizer.

Monroe said that deliveries on all three machines should begin in November.

Further information can be obtained from Monroe Systems for Business, American Road, Morris Plains, N.J. 07950.

Micros Speed 'Express' Delivery

(Continued from Page 61)

OEM and also based here, began building Federal Express' System Information Display scheduling network.

The Cromemco Z-2H microcomputers, which form the heart of Federal Express' preflight systems, are designed around Zilog, Inc.'s Z80 processor and include 64K bytes of memory and dual 5-in. floppy disk drives. For information storage, the systems also use 8-in. Winchester drives, each capable of storing 10M characters of data.

While Federal Express operates a network of 154 stations that provide door-to-door service to more than 240 major markets, the entire overnight delivery service revolves around the company's "Super Hub" located at the Memphis International Airport.

Here, every night, each air express overnight package is unloaded, sorted and reloaded onto about 60 jet airplanes. The computers track aircraft and crew scheduling, container weight, fueling, flight crew assignments and a number of other variables, the Federal Express spokesman said.

The system is also used to spot possible scheduling and loading problems before they create bottlenecks. For instance, during its first few days of operation, despite ongoing manual checks that said otherwise, the computers noted that one particular flight waiting on the runway was overweight. The problem was soon corrected by rolling out another airplane and splitting the delivery load, the spokesman said. All of the planes must be loaded and ready to take off by 3 a.m. if the firm is to meet its on-time next-day commitments, he added.

The System Information Display is currently being expanded for use by other facilities in Federal Express' nationwide system. For instance, the computers are in the process of being linked to the company's IBM 3031- and 3033-based data processing center at its corporate offices in Clark Tower here.

Surveys Report Salary Hikes for WPers

• *Lead WP Operators Near Top In AMS Salary Survey*

WILLOW GROVE, Pa. — Lead word processing operators earn the second highest salary among clerical workers, averaging $258 a week, according to a just-released survey by the Administrative Management Society (AMS).

Only executive secretaries earn more, according to the poll, which surveyed 498,760 employees with 5,970 companies in 122 North American cities.

As of Jan. 15, the weekly average for the 16 clerical positions — three of which were WP — was $219. In addition to lead WP operators, WP trainees and operators were also surveyed, commanding $174 and $213, respectively, as average weekly salaries.

The survey, which based the salary data on January figures, is the 35th consecutive survey for the professional management association.

Dividing the U.S. into five regions, the survey examined each of the job categories by region. According to the respondents, trainees garnered the lowest salaries in the West and the highest in the East. Operators in the West received the lowest salaries and the highest in the East Central region, while lead operators received top salaries in the East and lowest in the West Central region.

WP trainees earned $198 as an average weekly salary in the East; $197 as an average weekly salary in the East Central; $180 in the West Central; $182 in the South and $167 in the West.

In the East, WP operators earned $221 as an average weekly salary; $230 in the East Central; $212 in the West Central; $213 in the South and $207 in the West. Weekly salaries for

(Continued on Page 66)

• *IWP Survey Results Show WP Trainers' Salaries Up 8%*

By Ann Dooley
CW Staff

WILLOW GROVE, Pa. — Word processing trainers are earning 8% or more over 1980 figures, which rose from $287 to $311, results from a salary survey by the International Information/Word Processing Association (IWP) revealed.

In the IWP survey, word processing trainees earned $195 as an average weekly salary, WP operators earned $230, WP specialists I earned $256 and assistant supervisors earned $280. A WP supervisor earned $328, a WP manager earned $395 and an information manager earned $563 as average weekly salaries.

The data in the IWP's "Seventh Salary Survey Results" reflects responses from 2,450 companies in the U.S. and Canada and a total of 25,750 employees. Figures were reported from 15 job categories.

Comparisons between the IWP survey and the Administrative Management Society survey (see related story at left) must be made cautiously. While the IWP surveyed some of the same job categories as the Administrative Management Society's survey and its figures varied somewhat, differing dollar amounts can be attributed to compiling the statistics under job categories that are called by the same title, but may actually be different jobs.

Additionally, the AMS survey was conducted in January and the IWP survey was conducted in April, resulting in the usually higher salaries in the IWP survey.

Salary Findings

The IWP survey found the following salaries according to geographic regions:

- In the New England area, WP trainees earned $192 on the average; operators, $216; specialists, $245; assistant supervisors, $265; trainers, $260; supervisors, $315; managers, $391; and information managers, $597.
- In the Pennslyvania-New York-Delaware region, trainees earned $195, operators earned $234, specialists I earned $263, assistant supervisors earned $279, trainers earned $336, supervisors earned $348, managers earned $417 and information managers earned $593.
- In the Michigan-Indiana-Ohio-Kentucky region, trainees earned $191, operators earned $217, specialists I earned $248, assistant supervisors earned $268, trainers earned $285, supervisors earned $321, managers earned $372 and informa-

(Continued on Page 66)

Offers Layered Application

DEC Continues WP/DP Integration

MAYNARD, MASS. — Digital Equipment Corp. is continuing its integration of word and data processing by bringing two WP products, Decword and Decword/DP, to its high-level PDP-11 systems and RSTS/E operating software.

Available from DEC's Commercial Products Group and Government Systems Group, Decword/DP is a layered application software product for DP users who require an integrated WP/DP system.

Decword, a packaged, shared-resource system targeted to large, dedicated WP users, is available from DEC's Word Processing/Small Systems Product Group. Both products feature an interactive computer-based training self-paced module to be used with the Decword software.

First WP Application

With the ability to handle more than 30 concurrent word- and data processing users, Decword/DP is the company's first RSTS/E-based time-sharing WP application.

The software is available as an add-on application to existing RSTS/E installations, an add-on application with packaged terminals or as part of new RSTS/E-based DP systems ranging from the PDP-11/24 to the PDP-11/70, according to the vendor.

Minimum hardware requirements for Decword/DP are 128K-byte words of main memory, 3,500 blocks of free disk space (of which 300 must be contiguous) and at least one VT52-W or VT100-W terminal operating on any valid RSTS/E version 7.0 configuration. Prices start at $8,500.

Packaged System

Decword is a hard disk-based, packaged system capable of supporting from four to eight concurrent users and up to 40M bytes of storage. Built around the PDP/11-34 central processor, it is compatible with Decword/DP as well as Digital's other word processors including the Decmate word processor and WS200 shared-office system.

The basic system includes Decword software and documentation set, central processor with 256K bytes of main memory, four VT100 CRT terminals, 400 word/min. letter-quality printer and two RL02 hard disk drives. Prices start at $50,000.

Available for immediate shipment, both are installed and supported by Digital. Ongoing support will be provided by a toll-free telephone line.

Standard Digital WP features are offered, as well as list processing and math/sort utilities, the vendor said.

Digital is headquartered in Maynard, Mass.

Business Manager Uses Displaywriter

NEW YORK — An integrated financial services package using the IBM Displaywriter system was introduced by the United American Service Co. (UASC) here recently.

Aimed at small- to medium-size businesses, UASC's Business Manager service incorporates its financial software with the Displaywriter's WP/DP and communications features.

According to UASC, companies can perform most cash management and routine banking tasks in their own offices with Business Manager. The system can obtain information about all activity in all operating accounts through a link with a participating bank and shift funds between accounts, the company said.

It can also control, report, schedule and process all payables and amounts due as well as eliminate manual production of checks and drafts, UASC claimed.

The cost of the package will be between $8,000 and $12,000, depending on configuration, UASC noted. It is immediately available for delivery.

Marketing for the Business Manager will be done through franchise agreements with financial institutions, who will in turn sell it to their customers, the company stated. Through a volume purchase agreement, IBM will allow UASC to sell the Displaywriter with the Business Manager software at competitive market prices, UASC added.

In addition to business functions, UASC said that personal finances could be kept in order with the system. Needs such as instant access to checking and savings accounts and electronic bill paying can be met with Business Manager, according to UASC. By monitoring continuously updated information on certificates of deposit, savings and money market rates, cash management could also be achieved, UASC said.

A link to a national financial information and news network and an electronic mail system are other features of the package, UASC noted.

UASC can be reached through P.O. Box 15003, Knoxville, Tenn. 37901.

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Rapicom Adds Digital Facsimile System

FAIRFIELD, N.J. — Rapicom, Inc. has added a digital facsimile transceiver featuring full CCITT Group 3 and optional Group 2 compatibility for medium-volume electronic mail applications and a digital facsimile system featuring full-duplex and automatic reduction capabilities to its line of digital facsimile products.

With a 9,600 bit/sec step-down modem, the Rapicom 6100 digital facsimile transceiver permits unconditioned phone line transmission of all types of graphics forms.

Hard-copy information transmission is assured by multiple resolutions and selectable contrast controls, the firm said.

Featuring expanded compatibility, both manual- and automatic document feed and unattended reception, the Rapicom 6100 also offers short protocol for transmission time reduction, turnaround polling for automatic electronic mail, a built-in automatic paper cut mechanism, halftone mode, automatic document reduction, dry toner printing process and flatbed scanning.

The 6100 costs $10,000.

The Model 6350T/6300R (Transceiver/Receiver) system provides subminute speed and optimum cost efficiency for active electronic mail networks, the firm said.

While simultaneously accommodating two-way information traffic for enhanced operation versatility, the system can transmit oversize documents for automatic document reduction in an 8½-in. format at the receive terminal.

The system offers a 9,600 bit/sec step-down modem and multiple resolution transmit modes — high-speed-, standard- and fine detail. Coupled with selectable contrast levels, it is compatible with other Rapicom facsimile products.

The 6350T/6300R costs $14,000.

Rental arrangements are available for both the Rapicom 6100 and 6340/6300T, their vendor noted from 7 Kingsbridge Road, Fairfield, N.J. 07006.

Uses Flesch Readability Formula

Tool Checks Spelling, Readability

ARLINGTON, Texas — A product designed to check spelling and calculate document "readability" has been introduced by Legist Automation, Inc. here.

Operating on systems from Four-Phase Systems, Inc., the software package checks spelling in any Four-Phase Foreward Archive Document and computes readability according to the Flesch Readability Formula. This formula is legally acceptable in all 50 states, according to a Legist spokesman.

This computation or some equivalent is legally required by all state insurance boards in order to obtain approval of any new document, he noted.

Currently running under Four-Phase Multifunction Executive Release BN03, the product counts words, sentences and syllables when computing readability and reportedly "learns" as it is exposed to particular subject areas. Legist claimed "greater than 95% efficiency" after 15 to 20 documents have been processed.

The user's dictionary can contain high-frequency errors as well as correct terms. Provision is made for multiple dictionaries for special subject areas. Options allow unattended operation of the spelling checker and the ability to search documents for user-specified words, the vendor said.

Available immediately, the spelling checker and readability calculator cost $2,500. The spelling checker is also offered by itself for $600. Substantial discounts are available for users with multiple Four-Phase systems, Legist said from its headquarters at 1212 Millbrook Drive, Arlington, Texas 76012.

Multiword Cuts Prices

CINCINNATI — Software Clearing House has reduced the price for Multiword, its NCR Corp.-oriented word processing system. Multiword now costs $1,975 for all "I" sites (a reduction of more than 50% for its IRX version) and $2,975 for all VRX users.

The system provides format independence by separating the editing and formatting steps, according to the firm.

Multiword is covered by a 30-day warranty from Software Clearing House, 771 Neeb Road, Cincinnati, Ohio 45238.

Bradford Adds To Its WP/3000

IRVINE, Calif. — Bradford Business Systems, Inc. has introduced a set of enhancements to WP/3000, its software package for the Hewlett-Packard Co. 3000 series of processors.

The enhancements include a calendar scheduling system, enhanced electronic mail and more flexible mass mailing capabilities.

Additionally, the system has been given a friendly online tutorial that guides the user through the process of creating documents and aids in the overall use of the system, the vendor said.

The WP/3000 costs $6,000. Bradford Business Systems is located at 4920 Barranca Parkway, Irvine, Calif. 92714.

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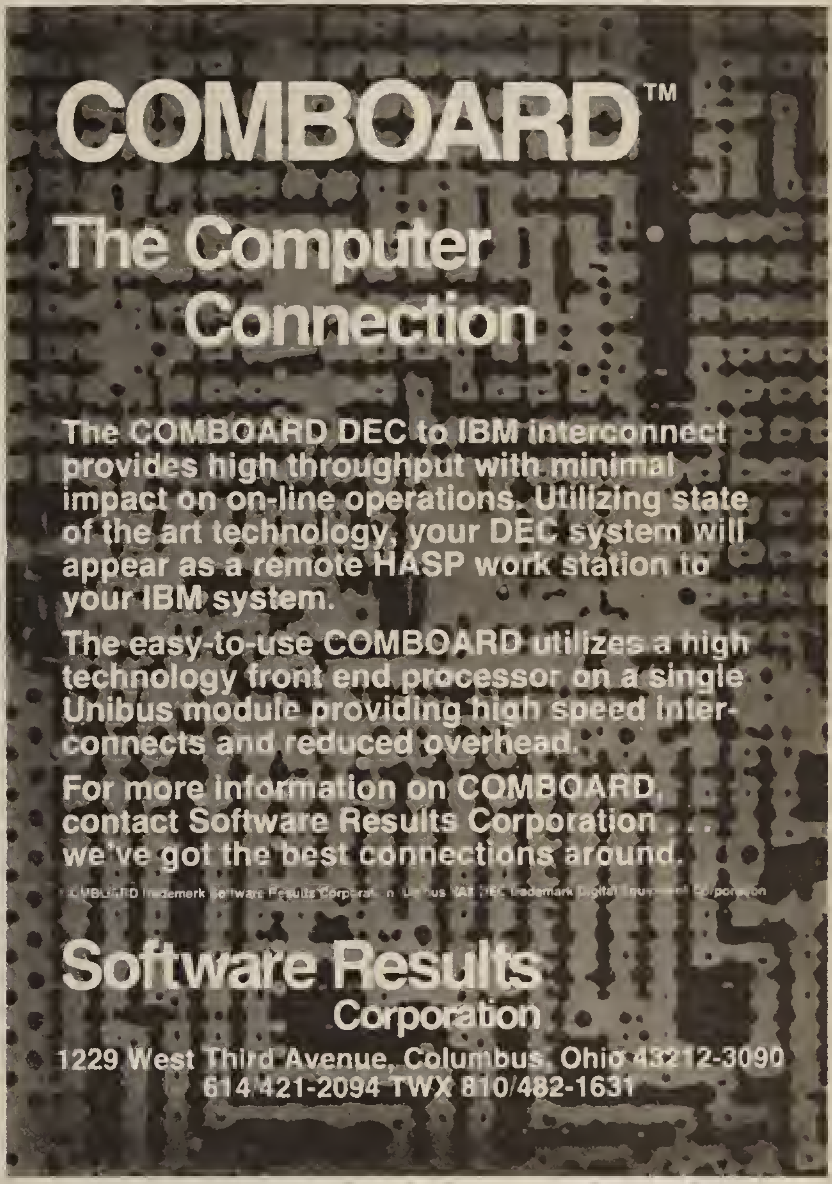

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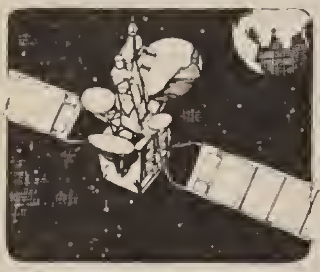

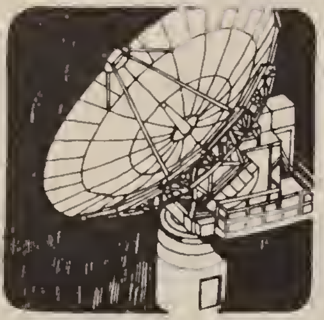

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Lead WP Operators Near Top in AMS Salary Survey

(Continued from Page 63)

lead operators averaged $266 in the East; $262 in the East Central; $248 in the West Central; $254 in the South and $264 in the West, according to the survey.

Weekly salaries were also surveyed across the country by type of business. WP employees in manufacturing/processing industries received the highest weekly salaries for all three postions.

Trainees in government jobs received the lowest average weekly salaries while operators and lead operators in banking, financial and insurance institutions earned the lowest salaries among those surveyed.

Other Averages

Manufacturing/processing industries were found to pay a weekly average of $209 to trainees; $239 to operators and $282 to lead operators. Banking, insurance and finanical institutions paid trainees $177; operators $197 and lead operators $235 on the average.

Retail/wholesale sales and distribution organizations paid an average of $189 to trainees, $211 to operators and $258 to lead operators.

Trainees in government agencies earned $165, operators earned $205 and lead operators earned $263 on the average. The Others category, which included utilities, educational, medical and employment, paid an average of $207 to trainees, $226 to operators and $254 to lead operators, the survey found.

The survey also selected more than 100 U.S. cities to examine for salary trends.

In Boston, for example, the average weekly salary for a WP trainee is $183 and is $218 for an operator and $243 for a lead operator. In New York, the average weekly salaries are $224 for a trainee, $261 for an operator and $313 for a lead operator. Cincinnati, Ohio, paid trainees $168, operators $217 and lead operators $259, the survey found.

In the Detriot area, trainees, operators and lead operators earned $224, $238 and $270 respectively as weekly averages. Trainees in Minneapolis/St. Paul, Minn., earned $192, operators earned $217 and lead operators earned $246, while in St. Louis, Mo., the same three categories earned $169, $198 and $243 respectively, the survey said.

Trainees in Dallas garnered $195 as an average weekly salary while operators earned $247 and lead operators earned $311. In San Francisco, trainees, operators and lead operators earned $264, $282 and $336 respectively. Seattle, Wash., paid trainees, operators and lead operators $208, $234 and $276 respectively, according to the survey.

The 1981-82 Office Salaries Directory, which also includes Canadian employee statistics, costs $90 from AMS at 2360 Maryland Road, Willow Grove, Pa. 19090.

Survey: Salaries Up for WPers

(Continued from Page 63)

tion managers earned $626 as average weekly salaries.

- In Arkansas, Texas, Oklahoma and Louisiana, trainees earned $206, operators earned $239, specialists I earned $257, assistant supervisors earned $290, trainers earned $322, supervisors earned $343, managers earned $381 and information managers earned $515.
- In California, Washington, Oregon and Hawaii, trainees earned $208, operators earned $269, specialists I earned $291, assistant supervisors earned $319, trainers earned $364, supervisors earned $361, managers earned $428 and information managers earned $579.

Salary figures were also computed in other regions of the country, as were statistics for respondents in 20 major cities in the U.S. and Canada and 32 industries.

The complete salary survey is available for $15 to IWP members and $25 to others. The IWP is located at 1015 N. York Road, Willow Grove, Pa. 19090.

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NAS 1986 Goal: Lead Competitor In IBM CPU Mart

By Robert Batt
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems (NAS) will overtake Amdahl Corp. as the chief competitor to IBM in large systems within five years, company executives claim.

Moreover, NAS is making inroads into IBM markets, according to David Martin, NAS vice-president of marketing, who taunted IBM for slow delivery of its latest big machine.

"In the last 12 months we have begun a thrust into the large-end systems marketplace," Martin said in a recent interview here. "So far we have delivered 13 systems and we confidently expect to regularly replace IBM and Amdahl equipment over the next year."

Bearing the standard in NAS' foray into the large systems market is its AS9000 series, introduced in September 1980. Comprised of three models — the 9000, 9000N and 9000 DPC — the series competes mainly in the range currently occupied by IBM's 3033 and 3081 machines.

Hitachi Commitment

According to industry sources, NAS has won a commitment from Hitachi, Ltd. to market its top-of-the-line M280H mainframe in the U.S. and Europe. If this is true, NAS' challenge to IBM's and Amdahl's high-end market would be fortified.

"Up until now, we have concentrated mainly in the medium systems market," Martin noted. "However, large systems is the fastest growing part of our business and is clearly going to occupy a major slice of our strategy.

"As a result, the overlap between our equipment and Amdahl's — which up until now has been very low — will increase, and by the end of 1985 we intend to be the second biggest large system supplier behind IBM."

IBM refused to comment on the NAS claims, but an Amdahl spokesman said that as both it and IBM's equipment become older, there is no question that it would be replaced.

Among the 13 organizations to take delivery of AS 9000 equipment to date are large systems users such as American Express Co., Informatics, Inc., the University of Houston, Pacific Gas and Electric and British Airways. At eight of the 13 sites, NAS replaced IBM equipment.

Industry Record Claimed

NAS is winning out against its competitors because, it said, its machines are cheaper, more reliable and are field upgradable. "One of the most important characteristics that large systems users are looking for is reliability as measured by systems availability," Martin said.

NAS claims to have set an industry record in the percentage of time that a computer is available to the user. IBM, it claimed, guarantees 95% availability and most vendors strive for 98%. However, NAS was able to exceed 99.9% availability on its AS9000 series, Martin said.

The company also claimed it is beating the competition on delivery dates. A typical installation period for its sys-

(Continued on Page 70)

Low-End 32-Bit Minis Join High-End Supermicros in Siege on Traditional 16-Bit Mart

By Marcia Blumenthal
CW Staff

The introductions in recent weeks of low-end 32-bit superminis by Perkin-Elmer Corp. and Data General Corp. appear to be the beginning of an invasion against the bread-and-butter 16-bit minicomputers that have dominated the market for the past decade.

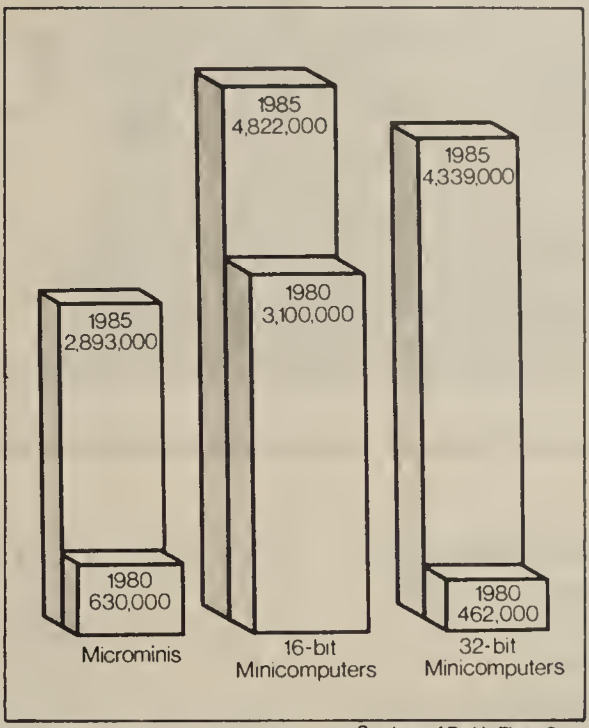
The traditional mini market is being squeezed at both ends — by the 32-bit system at the high end and by the "supermicro" at the low end; noted Richard Donnelly, computer systems product manager at PE's Technical Systems Division.

While the supermini makers have been scaling down their systems, Charles River Data Systems, Inc. is attacking the traditional minicomputer market from the bottom up microcomputer level. Although the company has been an OEM for Digital Equipment Corp. since 1973, it recently unveiled a 32-bit "supermicro" which, according to the firm, can offer the functionality of most of Digital Equipment Corp.'s PDP-11/70 family for prices between about $20,000 and $45,000 [CW, Sept. 28].

32-Bit Takeover

During the next three to five years, the largest segment of the traditional minicomputer industry — the $50,000 to $60,000 system — will be overtaken by the 32-bit mini system, Donnelly maintained (see accompanying chart). Thirty-two bit systems should be priced in the $25,000 to $35,000 range within the next couple of years, he added.

PE's recently introduced low-end 32-bit system, the 3210 [CW, Sept. 21], is priced at just under $50,000. PE has a 16-bit mini that it markets to the OEM sector for about $15,000, but the company is no longer actively promoting the system because it considers the time for the 32-bit mini has arrived.



Courtesy of Perkin-Elmer Corp.

Estimated Worldwide Minicomputer Revenues in Thousands (1980-1985)

The Intel Corp. Model 432 32-bit processor, which will be available in production quantities in the near future, will make the cost-effectiveness of a 32-bit system attractive to most users who previously may have opted for a 16-bit machine, vendors agreed.

DG has seen many users opting for its high-end MV/8000 system over the powerful 16-bit M600 unit, allowed Edward J. Zander, director of marketing for the company's Information Systems Division. And the firm expects its new lower end, 32-bit MV/6000 [CW, Sept. 28] will capture some

(Continued on Page 71)

Partners in Semi Industry Form $25 Million Venture Fund

NEW YORK — A $25 million venture capital fund that will invest in high-risk, start-up computer-related companies has been formed by two leading personalities in the semiconductor industry.

Although the partners say they will most likely avoid investment in semiconductor companies, they are aiming to funnel funds to entrepreneurs who exploit the product opportunities made available as a result of the quantum leaps semiconductor technology has taken during the past five years.

Sevin Rosen Management Co. is the brainchild of L.J. Sevin, the former chief executive and cofounder of Mostek Corp. and Benjamin M. Rosen, head of Rosen Research, Inc. and publisher of the "Rosen Electronics Letter."

Sevin left Mostek last December, a little more than a year after United Technologies, Inc. acquired the firm. Rosen resigned his position as vice-president and senior electronics industry analyst at Morgan Stanley & Co., Inc. last February to form his consulting and publishing company.

The partners have been raising capital for the fund from an international group of banks, insurance companies, mutual funds, college endowments and private individuals. The largest investor contributed $5 million to the financing of the new venture capital company that will be operated out of New York and Dallas.

Rather than wait for proposals to pass over their desks, Sevin and Rosen intend to seek out entrepreneurs with innovative product ideas for computer systems, personal computers, software, robotics, office automation and telecommunications, among others. In some cases they will fund individuals before they even start a firm, helping them to write a business plan and hire a management team. "We plan on doing this with about six companies during the next two to three years," Rosen said.

Although there is a tremendous amount of scrambling among venture capital firms to invest in hot technologies, the partners said fledgling entrepreneurs are interested in associating with investors that have experience in running start-ups and know the marketplace, both skills that Rosen and Sevin possess.

While start-ups are risky ventures, Rosen equates them with a unique aspect of the U.S. economy. Private venture funding is not widely available in other countries.

During the first half of this year, 20 new funds were established, three of which were larger than Sevin Rosen Management, according to Rosen.

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A-1 Al Lay
President
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9:15-9:45 **Coffee Break**

9:45-10:45 **Mini & Micro Based OEM Business Update**
A-2 Lawrence Chimerine
President
Chase Econometrics,
A Div.
of Chase Manhattan Bank

Richard Raysman
Attorney/CBN Columnist
Brown & Raysman

8:45-10:45 **The Magic of Sales**
A-3 Robert Hardy
President
Computer Composition
International

11:00-12:00 **OEM Survival Tools for the 1980's**
A-4 Jack Keen
Director, Management
Products
Input

11:00-12:00 **Acquisition and Diversification**
A-5 Gilbert Mintz
Partner
Broadview Associates

Robert J. Conrads
Principal
McKinsey & Company

12:00-1:30 **Luncheon**

Art Holst
Author/NFL Official
"The Challenge of a Pro"

1:30-2:30 **Influence of Growing Local Networks (Part I)**
N-1 Chairperson:
Robert Wickham
Vice President, Marketing
Vector Graphic, Inc.

Robert D. Brannon
Marketing Manager
OEM Microcomputer
Systems
Intel Corporation

2:45-3:45 **Influence of Growing Local Networks (Part II)**
N-2 Dr. Harry Saal
President
Nestar Systems

Ivan Socher
President & CEO
Amdax Corporation

4:00-5:00 **Networking and Distributed Data Processing**
N-3 Jon R. David
President
Systems R & D Inc.

Brian Green
Regional Director
Tandem Computers

1:30-2:30 **Input/Output: Market & Technological Structures**
T-1 Joseph G. Morris
Senior Vice President
Ramtek

Meldon K. Gafner
Director of Marketing
Communications
ISSCO

Peter Eisenhauer
Vice President, Marketing
Integral Data Systems

2:45-3:45 **Mass Magnetic Memory: Market & Technological Structures**
T-2 Chairperson:
Andrew Roman
Consultant
Random Access
International

Larry Hemmerich
Vice President
Cipher Data Products

4:00-5:00 **Voice I/O and Other Analogue I/O: Market & Technological Structures**
T-3

Len Magnuson
Vice President, Marketing
Centigram

Edward O'Neil
Marketing Manager
Voice Products
Interstate Electronics

1:30-2:30 **Retail Outlets**
O-1 David Pava
President
Byte Industries

Philip L. Reed III
General Manager
On Line Microcenters

2:45-3:45 **Are You Ready for An Ad Agency?**
O-2 Chairperson:
Thomas Casalegno
Publisher
Computer Business News

Robert McCullough
President
Aitkin-Kynett/SCB

Steven Tatum
Director of National
Marketing
Televideo

4:00-5:00 **OEM Agreements**
O-3 Sonny Monosson
Chairman of the Board
American Computer
Group, Inc.

1:30-2:30 **Application Generating Tools**

S-1 Chairperson:
William R. Stow
President
CPU International

Kent Lawson
President
Magna Systems

Chuck Butkus
President
The Software Factory

2:45-3:45 **Software Managment Strategies**
S-2 James Pettinger
Consultant/CBN
Columnist

Stephanie Rosenbaum
President
Tec-Ed

4:00-5:00 **Application Dynamics: Planning for Changes**
S-3 Gary Long
Partner
Lupper & Long

1:30-2:30 **Microcomputer Trends**
P-1 James J. Farrell III
Manager, Technical
Communications
Motorola, Inc.

Casey Powell
General Manager
Special Systems
Operations
Intel Corporation

2:45-3:45 **Legal Aspects of the Third Party Market**
P-2 Peter Vogel, Esquire

4:00-5:00 **Desktop Computers**
P-3 Allen Michels
President
Convergent Technologies

1:30-2:30 **IBM Watch**
C-1 George Pazloff
Director of Value Added
Remarketing
General Systems Division
IBM

H. W. Mattison
Program Manager
Value Added Remarketing
General Systems Division
IBM

Paul H. Espersen
Series 1 Technology
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2:45-3:45 **HP Watch**
C-2 Bob Kresek
Marketing Manager,
Worldwide
Third Party Sales
Hewlett Packard

4:00-5:00 **TI Watch**
C-3 Dr. W. Kenneth Wickham
OEM Marketing Manager
Texas Instruments

October 6 (Day 2)

8:30-9:45 **Japanese Vendors "Meet the Press"**
B-1 Thomas Hodson
National Sales Manager
Canon USA, Inc.

John Rehfeld
Vice President
Information Systems Div.
Toshiba

J. Garrett Fitzgibbons

Vice President & General Manager
TRW-Fujitzu Company

Saburo Kikuchi
General Manager
Sony Corp. of America

9:45-10:15 **Coffee Break**

10:15-11:15 **Software: The Growth Area of the Decade**
B-2 Ann Winblad,
Marketing Director
Product Planning
Open Systems, Inc.

James Pettinger
Consultant/CBN
Columnist

10:15-11:15 **Financing Your Business and Product Development**
B-3 Gordon Rapkin
Chief Executive Officer
AMSI

11:30-12:30 **Sales & Marketing Planning**
B-4 Howard Levin
Director, Systems
Marketing
Arrow Electronics, Inc.

11:30-12:30 **Stop Giving Away Services**
B-5 George McArthur
Sales Manager
Decision Data

12:30-2:00 **Luncheon**

William Moore, Jr.
Vice President, Computer
Operations
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2:00-3:00 **Europe as a Market**
M-4 Christopher Codrington
Interco Business
Consultants, Ltd.

3:45-4:15 **Beyond the European Market: The Next Step?**
M-5

2:00-3:00 **PR: The Unified Corporate Philosophy**
U-4 Chairperson: Vic Farmer
Editor
Computer Business News

Carole Ely
Sr. V.P., Communications
Vector Graphic, Inc.

Mark Nigberg
President
The Nigberg Corporation

3:15-4:15 **Office Automation: One Stepping Stone Beyond WP?**
U-5 Phil Roybal
Manager, Computer
Programs
Apple Computer

Thomas R. Sinopoli
President
Thomas R. Sinopoli Assoc.

2:00-3:00 **Special ADAPSO Session**
P-4

2:00-3:00 **Sourcing Software**
S-4 William Grinker
President
American Computer
Group, Inc.

3:15-4:15 **Watering the Software Desert**
S-5 Ben J. Dyer
President
Peachtree Software Inc.

Barbara L. Stafford
Director, Sales & Marketing
TCS Software

2:00-3:00 **DG Watch**
C-4 Patrick Dodds
Marketing Manager
General Distribution
Data General Corporation

Al Ormiston
Product Mktg. Mgr.
Data General

Richard R. Farwell
Director Mktg. Support
Small Business Sys. Div.
Data General

3:15-4:15 **DEC Watch**
C-5

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Cost is $295 for two full days of sessions and lunch each day. There will be a $50 service charge for cancellations after September 28. Registration may be transferred at no charge. Contact the New York Hilton directly for hotel accommodations; call 212-586-7000, and mention you'll be attending The OEM BUSINESS FORUM.

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30 Multi-Quantity End Users
40 Manufacturers of Computer Systems or Peripherals
50 Manufacturers of Office, Business, Personal and Consumer Systems
60 Hardware OEMs
70 Distributors/Dealers/Retailers
80 Consultants
90 Other (Specify)______

B. Title/Function. Please circle ONE only.
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20 Operations Management
30 Software Development
40 Engineering
50 Marketing
60 Consultants
70 Researchers/Educators
90 Other (Specify)______

C. Size of Organization (no. of employees)
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CW 13

Magnuson Solves Production Woes

SAN JOSE, Calif. — Magnuson Computer System Corp. has apparently solved its production problems for its top-of-the-line IBM 4300-compatible units. The firm has installed 40 of its M80/42 and M80/43 series machines during the past two months, it said.

The delay in gearing up for production of its high-end units caused a second-quarter loss of $2 million for the plug-compatible manufacturer.

The M80/42 and 43 operate 1.1 times faster and 1.3 times faster, respectively, than IBM's similarly configured 4341 Group 1 units, Magnuson claimed.

NAS Closing in on Amdahl

(Continued from Page 67)

tems is 60 to 90 days, which would enable NAS to get about 50 systems in the field before Amdahl even begins shipping its new 5860, with which the AS9000 would compete.

"We see stimulated market activity in large systems, given the supposed demand for IBM's 3081. However, due to the long delivery times on that system, we are able to offer much faster delivery . . . creating a huge opportunity for us to acquire completely new business," the marketing vice-president said.

Strategic Move

The NAS thrust into the large systems market is part of a concerted strategy to broaden the company's product base, using its 650 installations worldwide as a foundation for future growth.

Having acquired the Itel Corp. computer base when that company relinquished its data processing activities, NAS decided that broadening its base beyond a single market sector or IBM-compatible product would give it greater market credibility and hence better growth prospects.

"The image of the large system supplier is always a cut above the rest, partly because of the large and prestigious nature of their user base, and this is what we are aiming to achieve," Martin said. He admitted NAS suffered in the past from not having a presence in the large systems market and orders were lost.

The goal, he said, is to have 15% to 20% of this market within five years.

Users Favor NAS Entry Into CPU Market

An informal poll of AS9000 users carried out by *Computerworld* shows that they generally view the National Advanced Systems (NAS) entry into the large systems marketplace as a healthy development.

Faster delivery times, more reliability and greater processing power are among the reasons NAS users say they are choosing the AS9000 series.

A typical response to the poll came from First Data Resources, Inc. of Omaha, Neb., which replaced an Amdahl Corp. 470V/6 with an AS9000. "The NAS processor was the largest available commercial processor that we could get. It was available within 60 days, and to date we have had virtually no problems," Mike Luddy, the firm's vice-president of new product development, said.

"I believe the NAS presence improves the price/performance options available to users because it keeps the other manufacturers' prices in line."

New Users

For new users such as the University of Houston, the AS9000 was attractive because it is field upgradable, something the user was keen to ensure because it utilizes the machine for instruction and research applications throughout the four schools of the university. This was the deciding factor in NAS winning the order over IBM and Amdahl, a spokesman said.

Faster delivery times and greater negotiating flexibility were cited by Pacific Gas and Electric Co. (PG&E) of San Francisco as the major reason for replacing its IBM 3033 with an NAS machine.

The company has already placed an order for six IBM 3081 systems, but, the user said, it will take four to five years before all the systems are installed.

A spokesman for PG&E said, "The long lead times for the 3081 was one of the major reasons we decided to go to NAS. Also, NAS is able to be flexible with prices in a way that IBM isn't."

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Citicorp Fires Back at Critics

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Citicorp, under the gun in regulatory proceedings here for its proposal to expand commercial DP services activities, struck back last month, charging its opponents are trying to monopolize the market for themselves.

Richard A. Whiting, Citicorp counsel in the action before the Federal Reserve System, also tried to show the bank holding company's antagonists are not necessarily representative of the large and diverse DP services industry.

Several officers and members of the Association of Data Processing Service Organizations (Adapso) testified during the Sept. 21-23 hearings.

The association is contesting Citicorp's request for Fed approval to offer various commercial data processing services [CW, Feb. 9, July 20].

Monopoly Predicted

Adapso claimed large banks would be able to use their considerable reputation, revenues and marketing power to monopolize the market, perhaps through illegal cross subsidization and tying arrangements the Fed would not be able to effectively police.

Citicorp, for its part, argued it must use the latest technology to best serve its customers and fight growing competition from a number of quasi-banking concerns, such as credit card companies and brokerage houses, a spokesman said.

The bank has asked the Fed to clarify national banking regulations to explicitly allow greater service offerings by banks — services that Citicorp said are already legal. Adapso and several of its members are also fighting the proposal in other regulatory agencies and in the courts, according to the spokesman.

Opening the Sept. 21 cross-examination of Adapso President Jerome L. Dreyer, Citicorp's Whiting noted the association represents only about 400 DP service companies out of an industry of thousands of firms. And only a handful of Adapso members are directly participating in the Fed proceeding, Whiting said.

Whiting also told Dreyer that Adapso has for 10 years accused banks of cross subsidizing and tying traditional banking services without any formal documentation of the charges.

National Semi to Close U.S., UK Offices

SANTA CLARA, Calif. — National Semiconductor Corp. has scheduled additional temporary shutdowns in its U.S. and UK semiconductor operations.

Because of continued market softness, National Semi will shut its California semiconductor facilities for four days in November, during the period from Nov. 20-29. Similar operations in Danbury, Conn., and Salt Lake City, Utah, will be closed for three working days.

In the UK, the firm is closing its facility in Greenock, Scotland for three days.

In all, 13,000 workers will be idled by the shutdowns.

National Semi has already had four shutdown days since August and has previously announced four additional closings for four days during December.

The shutdowns are being made to reduce inventory levels and are in keeping with the company's "no layoff" policy, the company said.

Xerox Schedules End-of-Year Layoffs

STAMFORD, Conn. — Stiff price competition in the office products and office automation arenas are causing Xerox Corp. to plan for layoffs, which will probably occur by the end of the year.

"To ensure continuing competitiveness in all our business areas, we are in the process of restructuring and resizing the company," the firm said in a prepared statement recently.

One of the key objectives is to trim costs on a permanent basis, which will result in a reduction of the firm's overall workforce. Currently the company employs 67,000 people in the U.S.

The company said it would accomplish the streamlining through attrition, voluntary layoffs and redeployment of workers. The firm is reportedly offering bonuses for some employees who volunteer to resign.

Although layoffs are scheduled by year-end, the firm has started to examine the areas that need trimming.

Attack of 16-Bit Minis Under Way?

(Continued from Page 67)

users who may have previously chosen the firm's C350 processor.

Although Zander sees many users bypassing 16-bit minis for 32-bit units, he thinks the traditional mini will be in demand for a long time to come, particularly for real-time industrial applications. DEC is still selling a lot of PDP-8's, the unit that the 16-bit machine replaced, he observed.

Space Issue Solved

The 32-bit system has solved the logical address space issue, noted Dan DeLea, vice-president of marketing at Charles River Data Systems.

With a 16-bit machine users can address only 64K bytes of memory compared to 16M bytes of memory with the 32-bit machine.

Charles River Data Systems is targeting its product to the OEM sector, which is responsible for a major chunk of 16-bit minicomputer sales. OEMs are highly sensitive to price and equate the term micro with price/performance rather than with a type of processor, DeLea maintained.

Major Obstacles

However, compatibility of programs and the cost of converting them to 32-bit sytems are the major obstacles many current 16-bit minicomputer users may face in their decision to move to 32-bit systems. However, programs written in higher level languages such as Cobol and Fortran can be easily converted to the 32-bit architecture, vendors agreed.

Nonetheless, vendors are targeting much of their 32-bit products to new users and OEMs who will configure application-specific programs for users.

DG has stressed the compatibility of its line of systems and Zander said DG users will have no problem migrating between the 16-bit and 32-bit systems.

Charles River Data Systems has developed its Unos operating system, based on the Unix system, which is a portable operating system.

As yet, DEC has not introduced its Nebula system, popularly referred to as "Baby Vax," expected in the near future by industry observers and competitors. Vendors are watching to see how DEC solves its compatibility problem as its programs are written in bit mode, which divorces 16-bit users from 32-bit system users.

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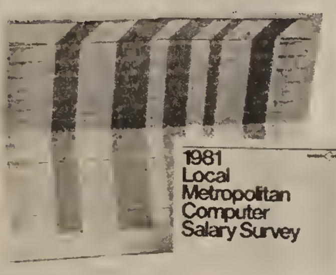

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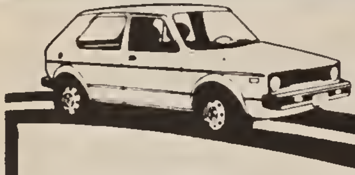

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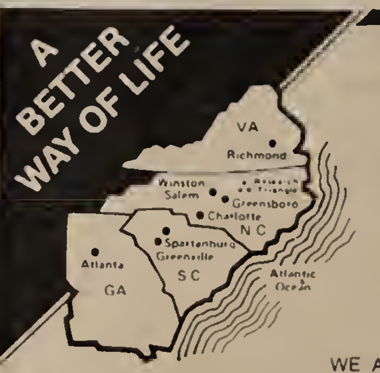

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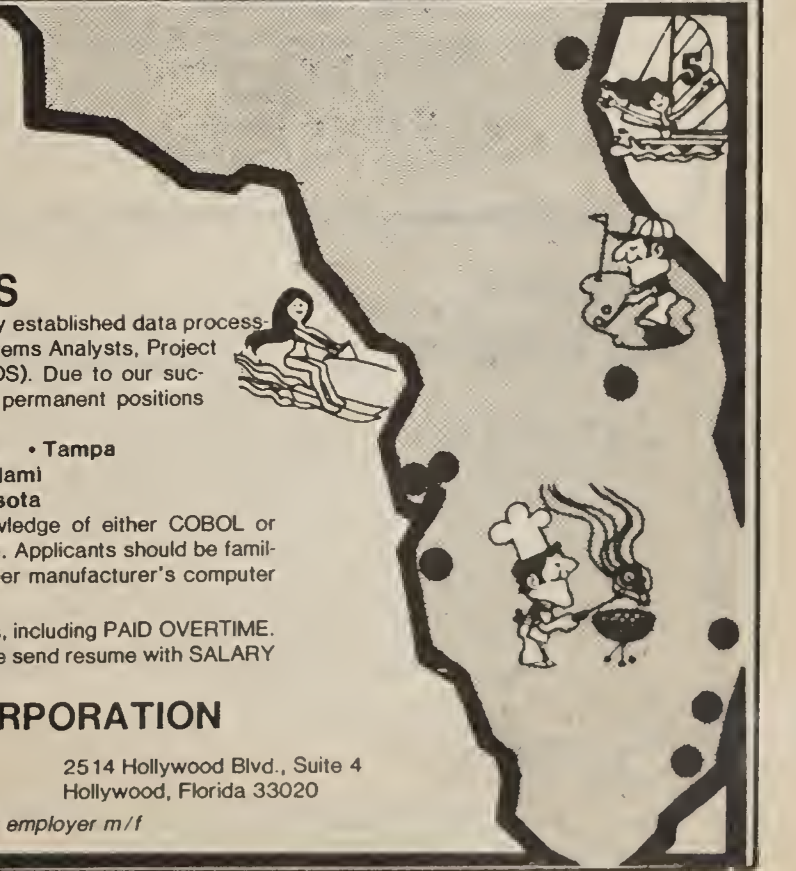

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The successful applicants should possess knowledge of either COBOL or BAL. Expertise in IMS, IDMS, or CICS is desirable. Applicants should be familiar with IBM (OS or DOS) and preferably one other manufacturer's computer system.

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Qualifications: 5-10 years practical experience in the industry. Must possess in-depth technical knowledge of communications facilities, modems, and multiplexers as well as familiarity with various types of data, interfaces, and communications protocols.

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Qualifications: 2-4 years in minicomputer operating system support with particular emphasis on NCR T-8270 systems. "Hands-on" working experience with sophisticated telecommunications diagnostic equipment is required.

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Qualified applicants should contact us today by sending your resume with detailed work experience and salary history to: **Leslie Miller, H. J. WILSON CO., INC., P. O. Box 66221, Baton Rouge, Louisiana 70896**

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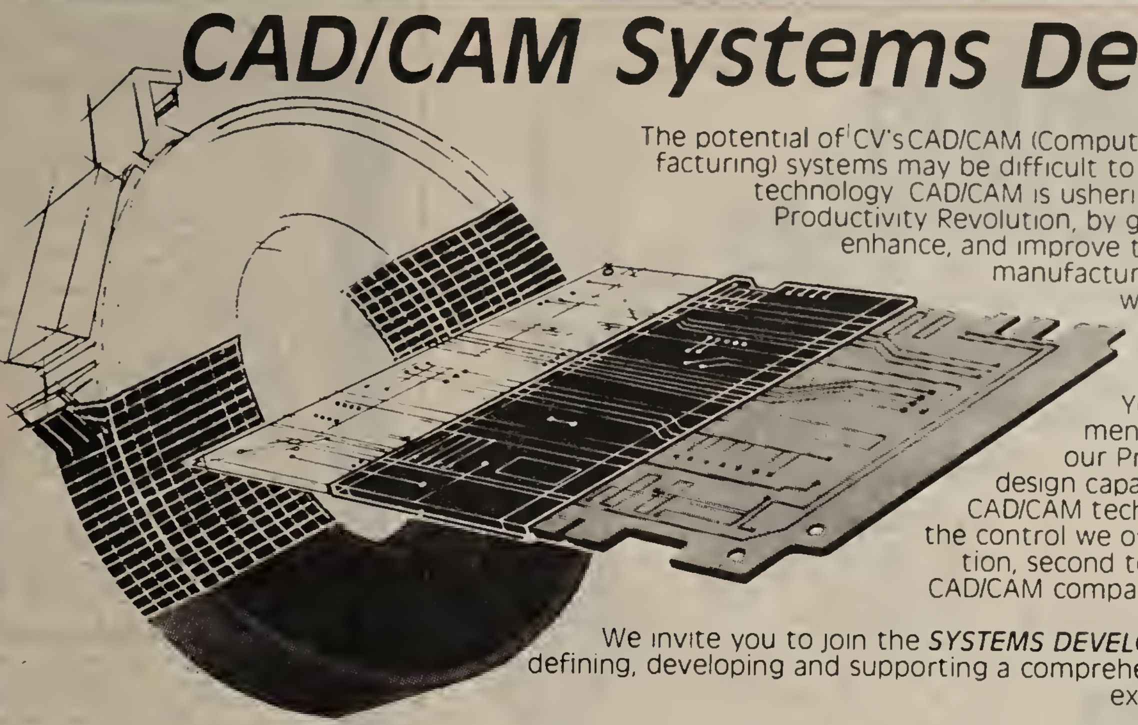

The potential of CV's CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) systems may be difficult to believe But you will when you see our technology CAD/CAM is ushering in the 3rd Industrial Revolution, the Productivity Revolution, by giving the world a technology to speed, enhance, and improve the accuracy of design engineering and manufacturing And Computervision is leading the way in applications from electronics and aerospace to manufacturing systems

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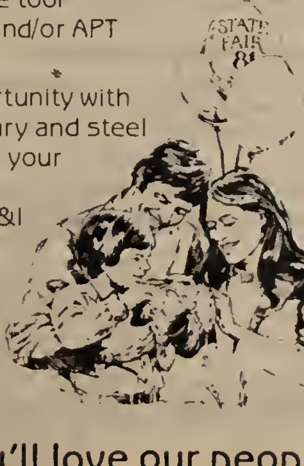

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SYSTEMS PROGRAMMER

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Candidates must have a minimum of 6-8 years of Data Processing experience with at least three years in the technical areas. Management background and skills necessary. Experience with data base systems and/or communications systems a definite plus.

Senior Systems Software Programmer

This position reports to the Manager/Systems Software Programming and has the responsibility for developing, evaluating and implementing solutions to problems relating to systems software and its integration into production systems.

Candidate should have 5 years of DP experience with a minimum of 2-3 years experience as a Systems Programmer. Experience with Data Base a plus.

Systems Analyst

This position reports to the Manager of Systems and Programming and works closely with user departments to analyze and define objectives, information requirements, and to develop alternative design solutions to business problems. Candidate will also provide technical and analytical guidance to project teams in the design phases of projects.

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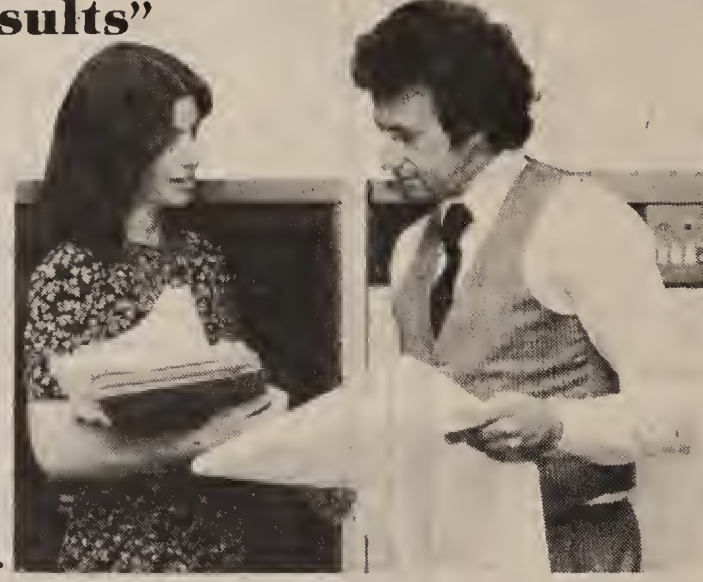

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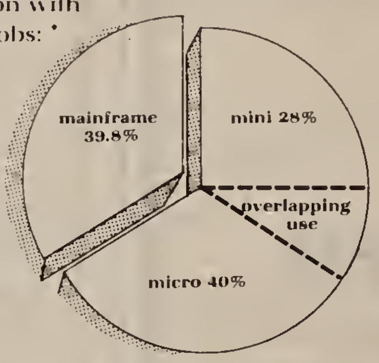

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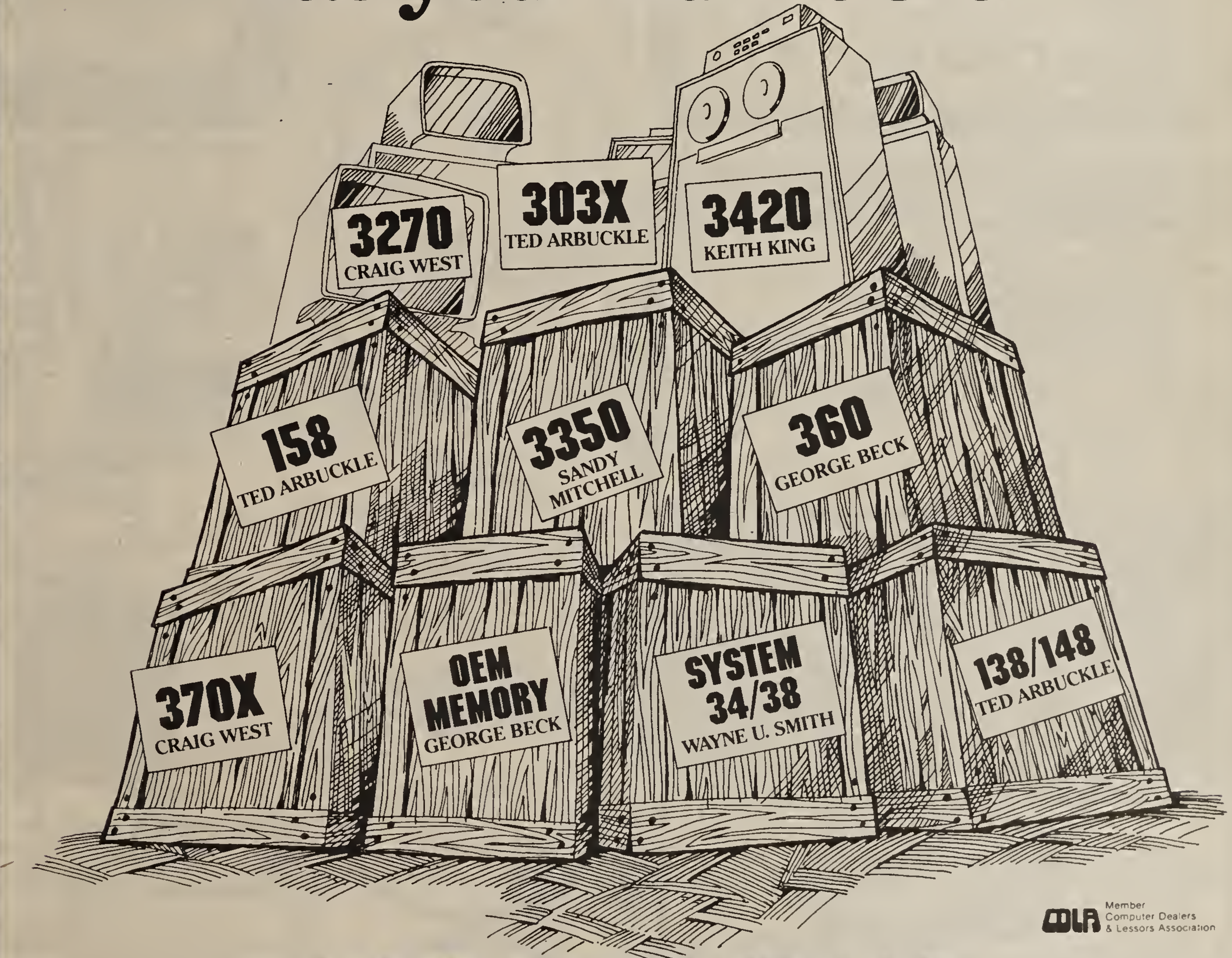

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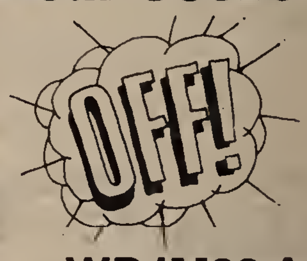

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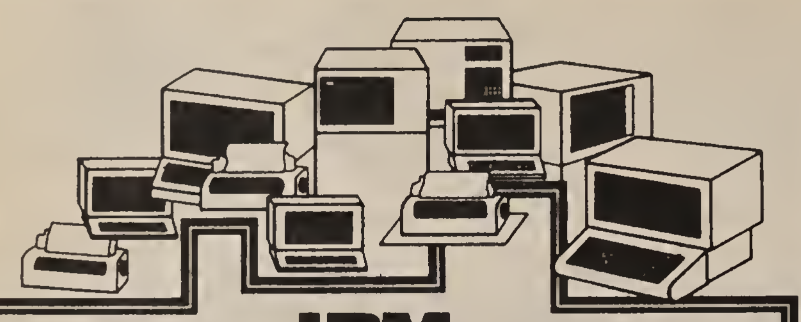

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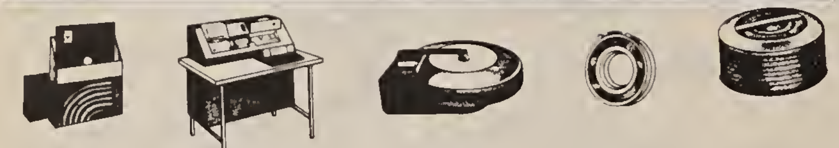

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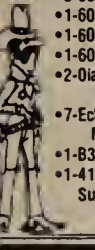

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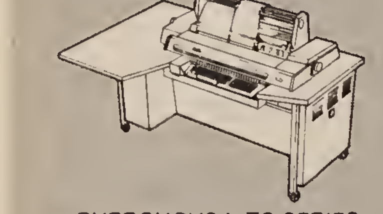

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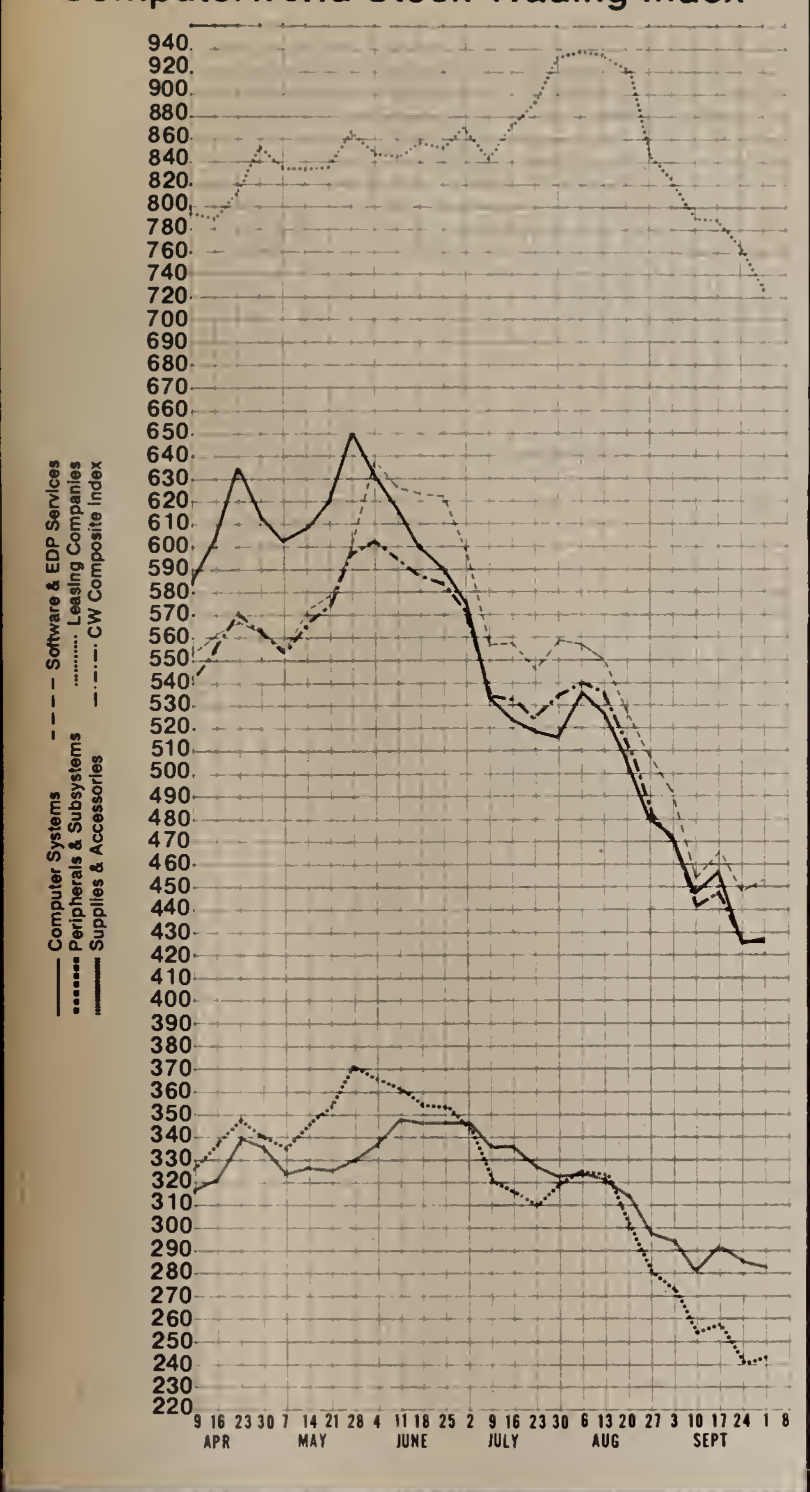

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COMPUTER SYSTEMS

EXCH		1980-81 RANGE (1)	CLOSE SEP 30 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	23- 46	26 1/4	0	0.0
N	BURROUGHS CORP	30- 72	30 1/4	-1 5/8	-5.0
O	COMPUTER AUTOMATION	9- 28	9 1/2	- 3/4	-7.3
N	CONTROL DATA CORP	60- 84	65 1/8	0	0.0
N	CRAY RESEARCH INC	29- 49	31 5/8	- 1/8	-0.3
N	DATA GENERAL CORP	42- 87	49	+5 1/4	+12.0
N	DATAPOINT CORP	40- 68	46 3/4	+5 1/8	+12.3
N	DIGITAL EQUIPMENT	80-113	89 1/4	+2	+2.2
A	EECO INC	7- 19	7 1/8	+ 1/2	+7.5
N	ELECTRONIC ASSOC.	5- 13	4 3/4	- 1/8	-2.5
N	FOUR-PHASE SYSTEMS	18- 46	28 1/4	- 3/8	-1.3
N	FOXBORO	42- 62	43 1/2	- 1/8	-0.2
O	FULCRUM COMP GRP	0- 0	1/2	- 1/4	-33.3
O	GENERAL AUTOMATION	7- 16	7 3/4	- 3/4	-8.8
N	HARRIS CORP	39- 60	38 5/8	-1 3/4	-4.3
N	HEWLETT-PACKARD CO	33- 54	42	+1 1/4	+3.0
N	HONEYWELL INC	79-115	81 5/8	+2 1/4	+2.8
N	IBM	53- 73	54 1/8	- 3/8	-0.6
O	MAGNUSON COMP SYSTS	12- 32	11 3/4	-2 1/2	-17.5
N	MANAGEMENT ASSIST	11- 26	11 3/8	+ 1/4	+2.2
O	MINI-COMPUTER SYST	1- 4	1	0	0.0
N	MODULAR COMPUTER SYS	8- 32	8 7/8	- 3/8	-4.0
N	MOHAWK DATA SCI	11- 32	13 1/4	+1	+8.1
N	NCR	47- 76	47 3/4	+ 3/8	+0.7
N	PRIME COMPUTER INC	18- 49	20 7/8	+2 1/8	+11.3
N	PERKIN-ELMER	21- 36	23	+ 1/4	+1.0
N	SPERRY CORP	31- 65	33 3/8	+ 3/8	+1.1
O	TANDEM COMPUTERS INC	13- 35	27 1/2	+2	+7.8
N	TEXAS INSTRUMENTS	82-151	82 7/8	-1 5/8	-1.9
A	WANG LABS.	23- 46	26 7/8	+3	+12.5

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EXCH		1980-81 RANGE (1)	CLOSE SEP 30 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	18- 29	21 3/4	0	0.0
N	COMDISCO INC	16- 24	17 3/4	+ 3/4	+4.4
O	COMMERCE GROUP CORP	1- 2	3/4	0	0.0
O	COMPUTER INVSTRS GRP	1- 4	3/8	- 1/4	-40.0
O	CONTINENTAL INFO SYS	4- 9	5 1/8	- 1/8	-2.3
A	DCL INC	3- 4	3 3/8	0	0.0
N	DPF INC	5- 12	8 3/8	- 1/2	-5.6
O	ITEL	1- 15	1/2	0	0.0
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 6	3	- 1/2	-14.2
N	RELIANCE GROUP INC	65- 99	83	-3 1/4	-3.7
N	U.S. LEASING	18- 30	23	+1	+4.5

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O	ADVANCED COMP TECH	3- 6	3 5/8	+ 1/8	+3.5
O	ADVANCED SYSTEMS INC	10- 15	11	- 1/4	-2.2
O	ANACOMP INC	11- 19	12 1/4	- 3/8	-2.9
O	ANALYSTS INTL CORP	3- 14	4 1/2	- 1/4	-5.2
A	APPLIED DATA RES.	13- 25	15	+1 1/2	+11.1
N	AUTOMATIC DATA PROC	22- 32	25 1/2	+ 7/8	+3.5
O	CGA COMPUTER ASSOC	4- 25	5	+ 1/2	+11.1
O	COMPUTER HORIZONS	1- 5	1 3/4	- 1/4	-12.5
O	COMPUTER NETWORK	4- 9	4 1/8	- 1/8	-2.9
N	COMPUTER SCIENCES	14- 30	14 1/8	-1 1/8	-7.3
O	COMPUTER TASK GROUP	13- 23	14 1/4	+ 1/4	+1.7
O	COMPUTER USAGE	2- 10	2 1/2	+ 1/8	+5.2
O	COMSHARE	7- 21	8 1/2	+1	+13.3
O	CULLINANE DATABASE	29- 69	52	+2	+4.0
O	DATA DIMENSIONS INC	1- 4	3/4	-	-7.7
O	DATATAB	2- 4	1 3/4	- 1/8	-6.6
O	DSI CORP	4- 9	5 1/2	0	0.0
O	DYATRON CORP	4- 11	4 3/8	- 3/8	-7.8
N	ELECTRONIC DATA SYST	15- 30	23 1/2	+1	+4.4
O	INFORMATICS INC	17- 34	18 3/4	+ 3/4	+4.1
O	INSYTE CORP	1- 3	1 3/4	- 1/2	-22.2
O	IPS COMPUTER MARKET.	1- 4	1 3/4	0	0.0
O	KEANE ASSOCIATES	4- 8	5	- 1/2	-9.0
A	LOGICON	23- 38	23 3/8	-2 3/8	-9.2
O	MNGT SCI AMER INC	17- 26	18 1/2	+ 1/2	+2.7
O	MATHEMATICA INC	12- 19	13 1/4	0	0.0
O	MATHEMATICAL APP GRP	15- 28	17 1/2	- 1/2	-2.7
O	NATIONAL DATA CORP	14- 28	16 5/8	- 1/8	-0.7
N	PLANNING RESEARCH	5- 13	5 1/2	+ 3/8	+7.3
O	PROGRAMMING & SYS	1- 2	1 1/4	- 1/8	-9.0
O	RAPIDATA INC	5- 11	10 1/4	+4 7/8	+90.6
O	REYNOLDS & REYNOLD	16- 26	16 1/2	- 1/2	-2.9
O	SEI CORP	17- 28	19 3/4	-1	-4.8
O	STSC INC	8- 28	8 1/4	-1 1/2	-15.3
O	SCIENTIFIC COMPUTERS	8- 16	8	- 1/4	-3.0
O	SOFTWARE AG	11- 23	13 1/4	+1 1/4	+10.4
N	TYMSHARE INC	26- 58	27 1/2	- 1/8	-0.4
A	URS CORP	11- 18	10 7/8	-1 1/8	-9.3
N	WYLY CORP	7- 20	8 1/8	+ 1/8	+1.5

PERIPHERALS & SUBSYSTEMS

EXCH		1980-81 RANGE (1)	CLOSE SEP 30 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	7- 25	6 5/8	- 7/8	-11.6
A	ANDERSON JACOBSON	10- 26	10 1/2	0	0.0
O	AUTO-TROL TECHNOLOGY	10- 62	9 3/4	-1 1/4	-11.3
O	BEEHIVE INT'L	6- 18	7	+ 1/4	+3.7
A	BOLT,BERANEK & NEW	9- 25	9 1/2	- 3/8	-3.7
O	CAMBEX CORP	2- 9	3 1/2	+ 5/8	+21.7
N	CENTRONICS DATA COMP	7- 40	9 5/8	+ 1/8	+1.3
A	CETEC CORP	4- 9	4	0	0.0
O	COMPUTER DEVICES INC	4- 10	4 5/8	+ 1/8	+2.7
O	COGNITRONICS	4- 11	5 1/4	+ 5/8	+13.5
O	COMPUTER COMMUN.	1- 8	1 1/4	+	+5.2
A	COMPUTER CONSOLES	20- 28	21 1/8	+ 1/2	+2.4
O	COMPUTER TRANSCEIVER	3- 9	5 3/4	- 1/4	-4.1
N	COMPUTERVISION CORP	20- 49	32	+ 1/4	+0.7
N	CONRAC CORP	17- 28	24	+2 1/8	+9.7
A	DATA ACCESS SYSTEMS	5- 23	5 1/2	+ 1/4	+4.7
A	DATAPRODUCTS CORP	19- 44	21 1/2	+1 1/8	+5.5
O	DATUM INC	2- 5	1 3/4	+ 1/8	+7.6
O	DECISION DATA COMPUT	3- 6	3	+ 1/4	+9.0
O	DELTA DATA SYSTEMS	2- 4	2 3/8	- 1/4	-9.5
O	DATARAM CORP	4- 15	4 3/4	- 1/8	-2.5
N	ELECTRONIC M & M	3- 9	3 1/8	- 3/8	-10.7
O	EVANS & SUTHERLAND	18- 40	25 1/2	+ 3/4	+3.0
O	FABRI-TEK	2- 6	3 3/8	+ 1/8	+3.8
O	GENERAL COMPUTER SYS	1- 12	5 1/2	+ 1/4	+4.7
N	GEN'L DATA COMM IND	9- 19	8 1/2	- 3/8	-4.2
O	GENERAL TERMINAL CP	1- 4	1	0	0.0
N	HAZELTINE CORP	19- 35	19 1/8	- 3/4	-3.7
O	INFORMATION INTL INC	8- 17	9	+ 1/2	+5.8
O	INTEL CORP	23- 51	24 1/4	0	0.0
O	IPL SYSTEMS INC	6- 15	6	- 3/4	-11.1
A	LUNDY ELECTRONICS	8- 18	8 5/8	- 1/2	-5.4
A	MSI DATA CORP	11- 27	15 7/8	+1 5/8	+11.4
N	MEMOREX	8- 18	10 3/8	- 5/8	-5.6
O	NETWORK SYSTEMS CORP	14- 25	15 1/4	- 1/8	-0.8
O	OMEX	2- 12	12	0	0.0
N	PARADYNE CORP	25- 52	38 3/8	+4 3/8	+12.8
A	PENRIL CORP	9- 17	8 7/8	+ 1/8	+1.4
O	RAMTEK CORP	9- 23	10	- 1/4	-2.4
N	RECOGNITION EQUIP	7- 21	7 1/8	- 1/4	-3.3
O	SCAN DATA	1- 5	1 3/8	0	0.0
N	STORAGE TECHNOLOGY	18- 36	32 5/8	+ 1/8	+0.3
O	SYKES DATATRONICS	8- 29	21 1/4	+2 3/4	+14.8
A	T BAR INC	12- 19	12 1/2	0	0.0
A	TEC INC	4- 7	4 1/8	+ 1/4	+6.4
N	TEKTRONIX INC	46- 70	48 1/8	+1 7/8	+4.0
N	TELEX	5- 9	5 1/8	+ 1/8	+2.5
O	TESDATA SYSTEMS CP	6- 17	6 1/8	- 3/8	-5.7
A	TIMEPLEX INC	10- 19	10 1/2	+ 1/2	+5.0
O	WILTEK INC	1- 3	1 1/4	- 1/4	-16.6

SUPPLIES & ACCESSORIES

EXCH		1980-81 RANGE (1)	CLOSE SEP 30 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	12- 17	11 1/2	- 5/8	-5.1
O	BALTIMORE BUS FORMS	1- 2	1	0	0.0
N	BARRY WRIGHT	15- 24	14 3/4	+ 1/8	+0.8
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 17	12 1/2	- 3/8	-2.9
N	ENNIS BUS. FORMS	15- 23	18 7/8	+1 5/8	+9.4
N	3M COMPANY	49- 65	50	+ 1/2	+1.0
O	MOORE CORP LTD	27- 38	29 3/4	- 1/2	-1.6
N	NASHUA CORP	17- 33	16 5/8	-2 5/8	-13.6
O	STANDARD REGISTER	30- 41	30 3/4	- 1/2	-1.5
A	TAB PRODUCTS CO	15- 30	15 1/8	- 3/4	-4.7
N	WALLACE BUS FORMS	22- 31	27 7/8	+ 5/8	+2.2

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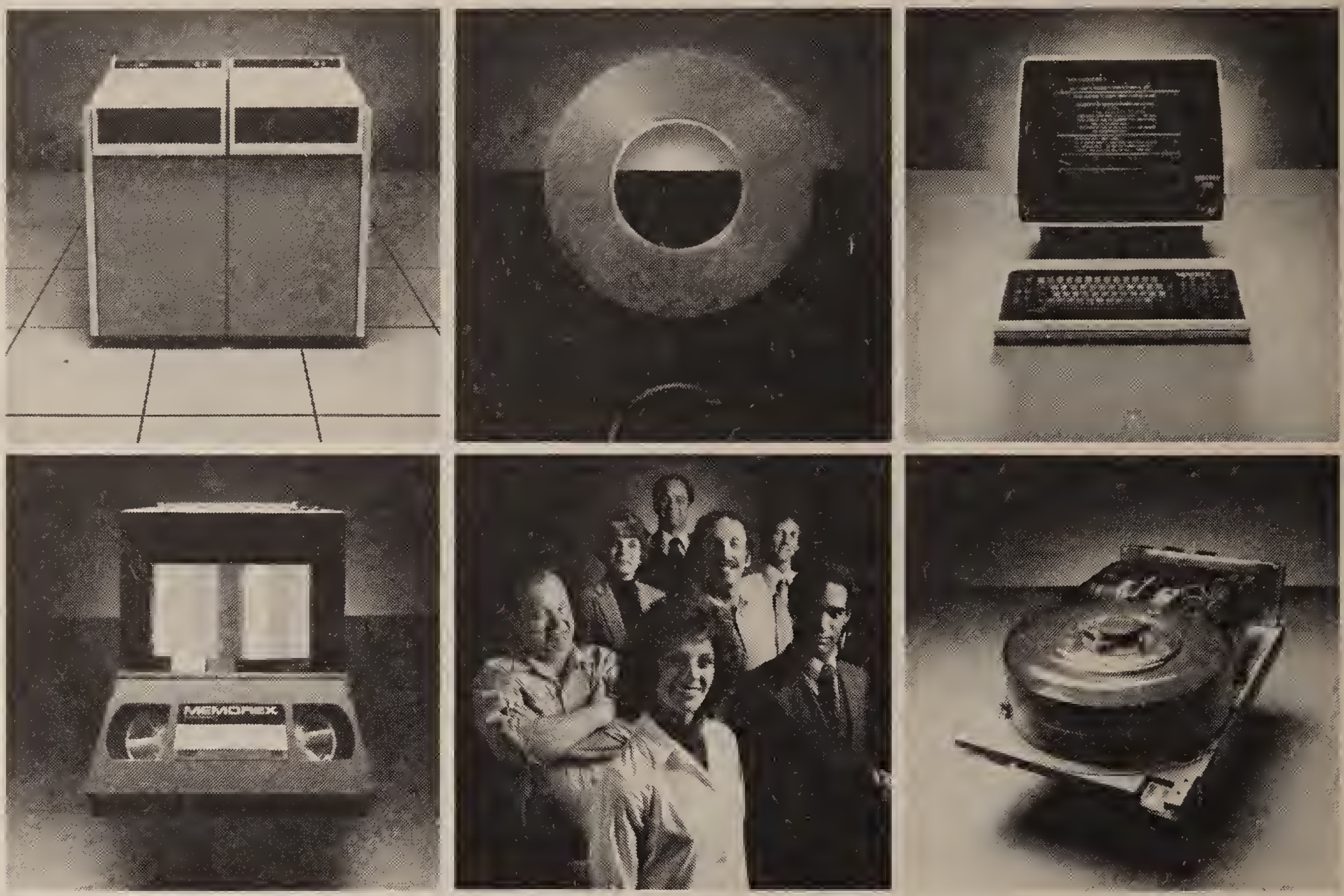

Those words are not mere product boasts. They describe, instead, the relentless realities of doing business in the marketplaces of high technology. Marketplaces with insatiable appetites for ever-smaller sizes, smoother surfaces, closer tolerances, faster accesses, greater capacities. Marketplaces with their own uncompromising process of natural selection.

Memorex® Corporation has been part of that environment since 1961. For 20 years, we have helped to shape the information recording, storage and retrieval industry. For 20 years, we have expanded our product lines to include everything from disc packs to disc drives, from audio and videotape products to communications terminals. And for 20 years, in an environment where change is the constant—and an unsympathetic, ever-accelerating constant at that—Memorex Corporation has done more than simply manage to change so as to keep up. We have *managed change itself* and stayed ahead.

And since ahead is where we intend to stay, we are taking those mandates for smaller, smoother, faster, and the rest and making of them points of pride, "expressions of excellence." Certainly, the accomplishments our people have made possible these past 20 years are noteworthy. And if we are not dwelling on them, it is because excellence, like change itself, moves in only one direction.

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